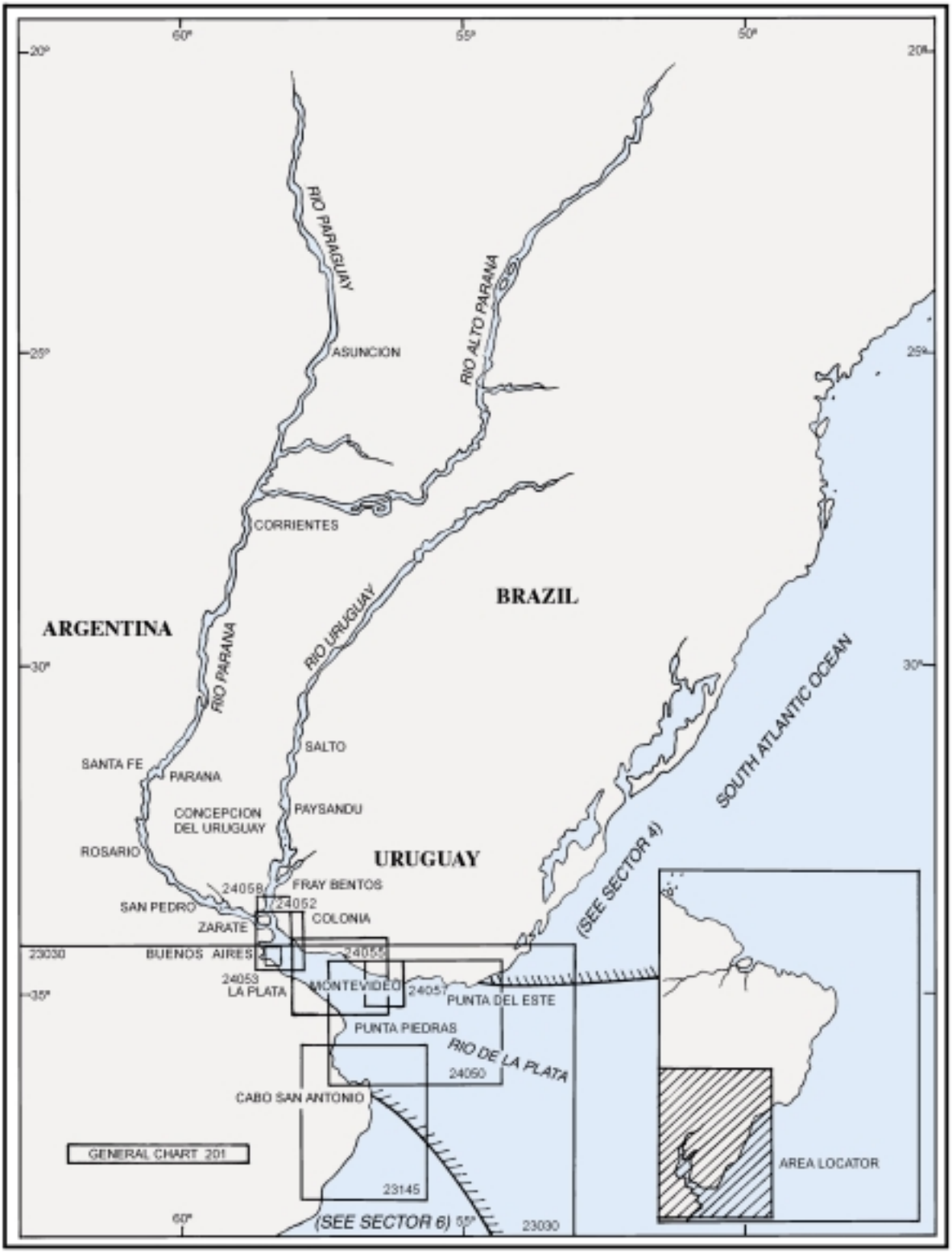
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CONCEPCION DEL URUGUAY
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ROSARIO
URUGUAY
FRAY BENTOS
24058
24052
SAN PEDRO
ZARATE
COLONIA
23030
BUENOS AIRES
24055
24053
LA PLATA
MONTEVIDEO
24057
PUNTA DEL ESTE
PUNTA PIEDRAS
RIO DE LA PLATA
24060
CABO SAN ANTONIO
GENERAL CHART 201
23145
(SEE SECTOR 6)
23030
SOUTH ATLANTIC OCEAN
(SEE SECTOR 4)
AREA LOCATOR

Table of Contents

SECTOR 5

RIO DE LA PLATA, RIO URUGUAY, RIO PARANA, AND RIO PARAGUAY

Plan.—This sector begins with a description of the N shore of Rio de la Plata and includes the Port of Montevideo; then, the S shore is described and includes the Port of Buenos Aires. Rio Uruguay, Rio Parana, and Rio Paraguay are then described in that order as far N as Puerto de Salto, Porto Mendes, and Porto Cuiaba, respectively.

General Remarks

5.1 Winds—Weather.—In the basins Rio Uruguay, Rio Parana and Rio Paraguay are rather variable in speed and direction. In general, winds from between the N and S through E predominate. Gusts of gale force may also develop during thunderstorms.

The air is clear along the river to Parana and beyond. Mirage effects are frequently reported. Dust haze develops during dry spells and bad visibility occurs during heavy rainstorms.

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The air is clear along the river to Parana and beyond. Mirage effects are frequently reported. Dust haze develops during dry spells and bad visibility occurs during heavy rainstorms.

Heavy rainfalls to the N, at the source of the river and their tributaries, cause periodic rise of water level.

Day temperatures are higher inland in summer and cooler at night.

Rio de la Plata

5.2 The estuary of the Rio de la Plata has frequent and rapid changes of weather characteristic of temperate climates.

Although NE winds are frequent over this region, they are not predominate at any season and wind directions might be better classified as variable most of the year.

Pamperos winds are particularly active in the Rio de la Plata region. These are cold, squalls wind from between S and W which follow the passage of a frontal trough.

About 20 Pamperos a year occur in Rio de la Plata, 12 at Buenos Aires and 16 at Montevideo. The hazard to navigation is due to the sudden onset of the squall with gusts of 70 knots or more. A gust of 107 knots was recorded at Montevieedeo in July, and a Pampero gust of 96 knots from NW in January, 1925, with considerable damage on both occasions. Between 80 and 100 cold fronts cross Rio de la Plata each year with a sudden change of wind from N to S.

The intervals between the troughs varies from 1 to 15 days, and they vary a great deal in intensity and duration.

Occasionally the front passes with little evidence other than the wind change.

Another danger to navigation in this area is the strong SE wind called Sudestada.

They develop when depressions from the Parana basin deepens rapidly near the coast before moving SE over the sea.

Occasionally, the wind reaches gale force with rough seas, rain and bad visibility.

During one of these storms, the SE wind averaged 62 knots over an hour and reached 86 knots in gusts. Between 5 and 8 Sudestada occur each year.

Sudestadas may develop during relatively high pressure with an average frequency of 3 per year at Montevideo. These SE winds may persist for a day or two to cause heavy seas and an appreciable rise in the level of Rio de la Plata.

Average cloud cover is rather constant at about half throughout the year. Amount of cloud increase over the open sea.

There is a gradual decrease in the annual total amount of rain from about 1,300mm near Porto Alegre to the N of Rio de la Plata to about 650mm at Bahia Blanca to the S. The rain is evenly distributed with no mark seasonal change.

Heavy showers account for most of the total, but prolonged periods of rain are not uncommon.

The maximum frequency of fog occurs in winter and reaches 10 percent along the coast from Montevideo N.

Sharp changes in temperature occur along this coastline during sudden wind changes. Winds from the N (Sondos) are hot and oppressive in summer, while S and W winds are cool and bracing. There is a sudden drop in temperature at the onset of a Pampero.

There is a greater range of humidity in this area than at lower latitude. Humidity is rather high because of onshore winds; around dawn on quiet clear nights, it may rise to 90 percent along the coast.

Rio de la Plata (35˚30'S., 56˚00'W.) is an extensive estuary formed by the confluence of Rio Uruguay. It is entered between Punta del Este and Cabo San Antonio, about 1 miles SW and extends in a NNW direction for about 140 miles.

The N shore and its approach, which comprises the entire coastline of Uruguay, is comparatively high and rocky, with sheer cliffs and sand dunes.

The whole of the S shore, which is entirely Argentine, is low and uniform in character and is bordered by an extensive shallow bank.

The estuary is remarkably shallow. To the W of Banco Ingles (English Bank), located 50 miles WSW of Punta del Este, there are no depths over 10m and much of the area has depths less than 5m; the ports of Montevideo, Buenos Aires, and La Plata being reached through dredged channels.

The nature of the bottom is varied. On the banks it is very fine hard sand, but in the deeper parts it is soft mud of a neutral tint and of a sticky nature.

The seaward limit of fresh water is in the vicinity of a line joining the mouth of Rio Santa Lucia, 12 miles WNW of **Montevideo** (34˚55'S., 56˚11'W.), and Punta Piedras, 50 miles SW.

The estuary can be divided into an outer, middle, and inner zone.

The outer zone, which lies seaward of the line joining Montevideo and Punta Piedras, has three channels with depths varying from 20 to 5.5m.

The N channel follows the coast of Uruguay, passing N of Banco Ingles and Banco Arquimedes; the middle channel leads between these shoals and Banco Rouen to the S; and the S channel lies between the latter shoal and the SW shore.

The middle zone lies between the outer zone and a line joining the **Port of La Plata** (34˚50'S., 57˚56'W.), 80 miles W of Montevideo, and the port of Colonia, 24 miles N of it.

It has three navigable channels: the N channel follows the Uruguayan coast, passing N of Banco Oritz and has depths of 3.4 to 6.7m in the fairway; the middle channel follows the S edge of Banco Ortiz and is separated from the S channel by Banco Magdalena, Banco Chico, and other smaller banks; it has natural depths of 7.9 to 10m, but the dredged channel leading to Buenos Aires and La Plata passes through it; the S channel follows the Argentine shore and has a minimum depth of about 5.8m in the fairway.

The inner zone extends from the W limit of the middle zone to the head of the estuary, about 35 miles NW. This zone contains the two channels giving access to the port of Buenos Aires, Canal Costanero, which leads to Rio Parana, and Canales a Martin Garcia which lead to Rio Uruguay.

Playa Honda, with depths of less than 5.5m, extends about 30 miles SE from the head of the estuary separating the two latter routes.

Many wrecks are charted in the estuary of Rio de la Plata, and because of the shallowness of the water, almost all of them are dangers to navigation.

The majority, particularly those near the routes leading to the ports in the estuary, are marked by lighted buoys or buoys, and in some cases by both.

In addition to the wrecks mentioned above, there are many lost anchors and cables on the bottom, most of these in vicinity of the anchorages in the estuary, where they are liable to foul the anchors of subsequent arrivals.

In the approaches to Rio de la Plata, discolored water, caused by the outflow of the rivers, will be found about 75 miles seaward of a line joining **Punta Espinillo** (34˚50'S., 56˚26'W.) and Punta Piedras, 50 miles SW.

A good guide, when the land is not in sight, is the fact that the bed of the estuary is hard on all the banks and soft in the channels.

Making the land at the mouth of Rio de la Plata does not present any great difficulty. The only difficulty is caused by the suddenness and frequency of the changes in weather, which is a characteristic of the climate of the estuary.

The latitude is of the greatest importance, and no opportunity should be lost of obtaining it either by day or at night, whenever the state of the weather will permit. Once the latitude has been determined a vessel can proceed with safety, provided she sounds frequently.

In clear weather, for a vessel approaching from N during a NE wind, the high land and islets near Cabo Castillo, and the light structures at Cabo Polonio and Cabo Santa Maria, are sufficient to identify the coast.

Banco La Plata is a large bank, with depths of 18 to 36m, which extends ENE from the N side of the estuary trending parallel with the N shore from 20 to 50 miles off it. It is composed of fine sand and broken shells.

Pozo de Fango (34˚45'S., 53˚30'W.) is a mud well which separates the E part of Banco de La Plata from the coastal bank. It is a marked depression in the ocean bed with depths of about 36 to 82m. Its bottom is mud with the consistency of sticky clay.

When the weather is not clear, a good parallel for making the entrance is that of **Isla de Lobos** (35˚02'S., 54˚53'W.).

A vessel approaching in this latitude will encounter Banco La Plata, which is about 10 miles wide in this vicinity, in about longitude 53˚10'W, in depths of 22 to 36m. The mud well, in which depths are more than 36m, will then be reached.

Radio beacons at Cabo Polonio, Isla Lobos, and a racon on Practicos Recalada lighted vessel can be helpful when approaching the estuary in bad weather.

After Pozos de Fango has been crossed on a course converging on the N shore and about 10 miles off, the nature of the bottom will change as follows:

First, mud and sandy grit, next, mud and shell, and finally, sand and shell will be found. The sand, becoming quite coarse, changes color and is mixed with gravel or pebbles and colored shells as the shore is neared, while the soundings decrease somewhat regularly to 26m and 22m about 4 miles offshore.

In thick weather or when the land is not plainly visible from that distance, the depths should not be shoaled to less than 28m.

When across the mud well, steer to pass well S of Isla Lobos, the bottom being mud. This island can easily be identified, as well as Punta del Este and the coastal hills NW, and also Sierra de las Animas, nearly in the same direction.

There are no off-lying dangers at a distance of 5 miles offshore, and it is only on rare occasions that the weather is so thick that the land cannot be seen.

In poor visibility, pay attention to the soundings over Banco La Plata and the mud well and do not enter the estuary unless Isla Lobos or the land in its vicinity has been sighted.

To the W of Isla Lobos, the bottom continues to be very soft, blue mud and the decrease in the soundings indicates the approach to Isla de Flores.

Make allowance for the current according to the wind, bearing in mind that the current sets strongly towards the shore during SE winds.

Because Cabo San Antonio is very low, except for the light structure, and only visible for a few miles, a vessel from S, in the absence of astronomical observations, must depend entirely on soundings unless the light structure is sighted.

A vessel entering Rio de la Plata S of Banco Ingeles should be certain of the latitude.

The estuary should be approached either on the parallel of 35˚35'S, which leads N of Banco Rouen, or on the parallel of 36˚10'S, passing S of this shoal, taking into account the state of the wind and the consequent current.

East of both shoals, the bottom is sand, mixed, in some places with shells; while W of them and on the meridian of Montevideo, the bottom is mud, except off Punta Piedras, where it is tufa and on Banco Ortiz, where it is sand.

West of Banco Rouen, course should be shaped for the desired port according to position, because due to the absence of marks, the depths and the nature of the bottom are the only guides.

Routing for vessels bound for Montevideo and Buenos Aires is discussed later in this sector.

Winds—Weather.—Rio de la Plata is subject to two regional phenomenon: Pamperos and Sudestadas.

With a Pampero, pressure falls slowly and the wind is N for a few days with high temperature and humidity. Then the wind becomes NE, strong and gusty; the regular land and sea breezes are interrupted and conditions become very oppressive. Shortly before the arrival of the cold front, the wind may fall calm.

The onset of the SW wind is preceded by a roll of cumulus clouds followed by an extensive cumulonimbus cloud.

As the cloud arrives overhead, there is a heavy sometimes violent squall from between the W and S. After a period of severe gustiness, the main current of cold air arrives, pressure rises, and temperature falls. There is usually a short period of torrential rain with thunder and lightning.

The general gloom is intensified by clouds of dust if the squall arrives from a W point. The maximum wind speed usually occurs at the preliminary squall.

Some of the more severe squalls occur in the summer, but the S wind following the frontal passage is stronger in winter and may persist for a few days. This strong S to SW wind, with mainly clear skies, is known locally as Pampero limpio.

About 20 Pamperos a year occur in Rio de la Plata, 12 at Buenos Aires, and 16 at Montevideo. The hazard to navigation is due to the sudden onset of the squall with gusts of 70 knots or more; a gust of 107 knots was recorded at Montevideo in July, and a Pampero gust of 96 knots from NW in January, 1925, with considerable damage on both occasions.

Between 80 and 100 cold fronts cross Rio de la Plata each year with a sudden change of wind from N to S. The intervals between the fronts varies from 1 to 15 days, and they vary a great deal in intensity and duration. Occasionally the front passes with little evidence other than the wind change.

Another danger to navigation in this area is the strong SE wind (Sudestada) which develops when depressions from the Parana basin deepen rapidly near the coast before moving SE over the sea. Occasionally the wind reaches gale force with rough seas, rain, and bad visibility.

During one of these storms in July, 1923, the SE wind averaged 62 knots over an hour and reached 86 knots in gusts. Between 5 and 8 Sudestadas occur each year.

Sudestadas may develop during relatively high pressure with an average frequency of 3 per year at Montevideo. These SE winds may persist for a day or two to cause heavy seas and an appreciable rise the level of Rio de la Plata.

Winds in the basins of Rio Uruguay, Rio Parana, and Rio Paraguay are rather variable in speed and direction. In general, winds from between N and S through E predominate. Gusts of gale force may develop during thunderstorms.

The percentage frequency of gales reaches a maximum of 5 percent in July and August near the coast. Most of these high winds are occasions of Pamperos and Sudestadas. The number of gales increases steadily to S and E of the sea area to reach 10 percent in the extreme SE of the zone in summer and up to 20 percent in winter.

Average cloud amount is rather constant at about half cover throughout the year in most of the zone. Relatively short periods of overcast skies occur during the passage of frontal troughs and long periods of almost clear skies are enjoyed during W winds in the S of the zone near the coast. Cloud amount exceeds 0.6 for most of year in the SE.

In this zone the rain is more evenly distributed throughout the year with no marked seasonal change.

Heavy showers account for most of the total, but periods of more prolonged rain are not uncommon. Amounts are higher inland along the river basins in summer due to the increase in showers over the hot land during the afternoon.

The maximum frequency of fog occurs in winter and reaches 10 percent along the coast from Montevideo to Porto Alegre, but in the extreme S of this zone there is more fog during October to February. Most of the fogs in Rio de la Plata occur with light E or NE winds.

Radiation fog on clear winter nights may obscure the river banks around dawn while the central parts of the river remains free of fog; these land fogs disperse by mid-morning. The air is clear along the river to Parana and beyond.

However, mirage effects have been quite frequently reported. Dust haze develops during dry spells and bad visibility occurs during heavy rainstorms.

The variations over the sea follow the pattern of the sea surface temperature. Sharp changes in temperature occur along this coastline during sudden wind changes. Winds from the N, known locally as Sondo, are hot and oppressive in summer while S and W winds are relatively cool and bracing.

A sudden drop of 10˚C is not uncommon at the onset of a Pampero, but the subsequent rise with the return to N winds is more gradual. Day temperatures are higher inland in summer and cooler at night.

There is a greater range of humidity in this zone than in the lower latitudes. Values are rather high in the N due to the prevalence of onshore winds, but further S the frequency of winds off the land brings drier air over the coastal waters and the humidity falls to 40 percent or below during much of the day. There is the usual rise to 90 percent or more around dawn on quiet clear nights along the coast.

Tides—Currents.—Because of the large body of water brought down by the rivers and the fact that the general movement of the water is greatly influenced by the wind, the tidal currents and currents are variable.

The normal range of the tide is small, and during light winds, the tidal currents are regular. During strong winds, the current in the outer part of estuary flows in the direction of the wind, but in the inner part the currents caused by such winds follow the normal directions of the tidal currents, according to whether the effect of the wind raises or lowers the water level.

Because of the small range of the tide, the rates of the tidal currents in the estuary are normally low. In general, the rate does not exceed 0.75 knot in the outer zone and over Banco Ortiz, but in the main channel the rate may reach 2 knots.

During strong winds, the tidal currents may attain a rate of 1.5 knots. In the outer zone, the direction of the current will be affected, but in the inner zone the direction is not usually affected.

The normal range of the tide is very small, being about 0.7m off **Cabo San Antonio** (36˚18'S., 56˚47'W.) and off Buenos Aires, 0.4m at Montevideo, and 0.7m at Colonia.

It is greatly influenced by the wind, which can multiply this range as much as six times. The chart datum in Rio de la Plata is about 0.4m below MLW; at HW, during S and SE winds, the depths may be 1.2m or more greater than those charted; whereas at LW, during N or NW winds, the depths may be less than those charted.

In the area between Punta Piedras and Buenos Aires, the winds have the following effect: those from between W and NE through N, lower the water level, the greatest effect being caused by those between NW and N; those from between E and SW through S, raise the water level, those between SE and S producing the greatest effect.

Winds from between NE and E and from between SW and W have little effect.

The effect of the wind on the water level is almost immediate, both when the wind begins to blow, or changes in direction.

A wind from between N and NW, with a force of from 4 to 5, will lower the water level by 0.5m, and if such a wind should suddenly change direction to between S and SE and blow with the same force, the water level will rise 0.9m in the space of one hour.

During the rise or fall of the tide, winds of force 2 from NW or SE, respectively, will be sufficient to arrest the tide or even to reverse its action.

Several zones have been established in the approaches to Rio de la Plata in which ships can discharge cargo in order to reduce their draft before proceeding to Montevideo or in Canal General. The limits of these zones are shown on the charts.

Pilotage.—Pilotage is compulsory in the estuary, except for coasting vessels. A vessel entering the estuary may proceed as far as Rada de Montevideo or Praticos Recalada lightship without a pilot.

All vessels proceeding further into the estuary must obtain a pilot from this light vessel, to which they are required to give 48 hours notice of the expected time of arrival.

The pilot conducts a vessel to the roadstead off **Puerto La Plata** (34˚47'S., 57˚51'W.) where he is relieved if the vessel is bound for Buenos Aires or up the rivers.

Vessels entering Rio de la Plata must use pilots of the nationality of their port of destination, and when leaving must use pilots of the nationality of the port which they leave.

Caution.—Because of the frequent changes in the weather, the irregularities of the currents, and the lack of landmarks, vessels should exercise great caution when navigating in the estuary. In some places, the banks and shoals are steep-to and the channels are narrow so that soundings may give little warning.

When soundings show a bottom of mud only, the vessel will be in the channel, but the more this mud is mixed with sand, or the bottom becomes harder, the nearer will be the shoal depths. The bottom near the banks and shoals is generally a mixture of black mud and sand, overlying stiff clayish mud.

Because of the possibility of other as yet unknown small knolls in the entrance to Rio de la Plata, the mariner should exercise caution and take frequent soundings.

Rio de la Plata Estuary—North Part

5.3 The coast on the N side of Rio de la Plata, between Punta del Este and Punta San Pedro, about 147 miles WNW, is comparatively high and rocky, with sheer cliffs and sand dunes. The N shore recedes N for a distance of about 11 miles between Punta del Este and Punta Brava, about 60 miles W.

Sierra de la Ballena (34˚50'S., 55˚01'W.), a range of rocky blackish hills, extends N from Punta Ballena; a large patch of white sand, which is prominent at a great distance from seaward, lies on the S slope of one of the hills about 7 miles NW of Punta del Este.

Monte Pan de Azucar (34˚48'S., 55˚16'W.) and **Sierra del as Animas** (34˚43'S., 55˚28'W.), the highest and most prominent summits near the coast in this vicinity, rise about 18 and 22 miles NW, respectively, of Punta del Este.

The former is an almost regular cone, 424m high, and has a conspicuous cross, 32m high, on its summit. The latter is 500m high, and has a flattened summit with a slight depression in the form of a saddle. It is visible when bearing about 295˚.

Montevideo, the capital of Uruguay and the largest seaport in the country, is located about 60 miles W of Punta del Este.

The N shore recedes N for a distance of about 13 miles between Punta Brava and Punta San Pedro, about 89 miles WNW.

Depths—Limitations.—Depths along the N side of Rio de la Plata decrease gradually from about 33m about 8 miles offshore in the vicinity of **Punta del Este** (34˚58'S., 54˚57'W.) to 18.3m about 28 miles W, then to 9.1m about 5 miles offshore S of the port of Montevideo, then to 5.5m about 2 miles offshore in **Canal Norte** (Paso Norte) (34˚28'S., 57˚52'E.).

A depth of 3.6m is available about 3 miles offshore on the N part of Banco Ortiz as far as the E approach to the port of Colonia where the depths increase to more than 5.5m within about 2 miles offshore. Canal Punta Indio affords greater depths between Montevideo and the port of Colonia.

Isla de Lobos is about 5 miles SE of Punta del Este and extends 0.5 mile S. It is rugged, barren, and 23m high. A light with a fog signal, radiobeacon, and a signal station is on the NE part of the island.

The island has been reported to be a good radar target at 14 miles.

The only landing place is a small sandy cove on the N side of the island.

Shoal depths of 18.3m or less extend 1 mile E, about 2 miles NW, and more than 0.75 mile W of the island.

The E side of the island is rendered unsafe for a distance of nearly 1 mile by Bajo de Lobos, a detached reef with a large above-water rock and Bajo del Sargo, detached rocks with depths of less than 1.8m.

A wreck, partly above-water, is on the E end of Bajo de Lobos. The S side of the island is comparatively steep-to; the W side less so, and there are depths of 10.9m at 0.6 mile.

The N side has depths of less than 10.9m for a distance of 0.5 mile, with a wreck, partly above-water, about 0.2 mile offshore.

Anchorage.—Anchorage has been obtained in a depth of 11m 0.5 mile from the lighthouse, with the lighthouse bearing 314˚.

Canal de Lobos, the passage between Isla de Lobos and the mainland NW, is about 4 miles wide, with depths of from 18.3 to 25m in the fairway.

The bottom is mud in the middle but changes to sand, coral, and rocks near the island and to small shells close off Punta del Este. The tidal currents in the passage are stronger than those S of the island.

Caution.—An obstruction, with a depth of 5.5m, has been reported about 15 miles S of Isla de Lobos. A 17.3m shoal patch is E of this shoal.

A shoal, with a depth of 12.8m, has been reported about 12 miles S of Isla de Lobos, but surveys have failed to find it.

A 10.9m shoal has been reported about 8 miles S of Isla de Lobos.

Banco Ready is a reef, with depths of 11.9 to 14.9m, about 7.2 miles W of Isla de Lobos.

A charted obstruction (position approximate) is about 20 miles WSW of Isla de Lobos.

Because other unknown knolls may exist in the vicinity of Isla de Lobos, caution is advised and soundings should be taken frequently.

A dangerous wreck lies about 12 miles WNW of the light on Punta del Este.

5.4 Isla de Flores (34˚57'S., 55˚56'W.), which is a good landfall, lies about 6 miles offshore in a position about 48 miles W of Punta del Este. The island is about 1 mile long in a NE to SW direction and has maximum elevation of 17m; near the NE end it is divided into two parts by a reef with a causeway on it. A chimney on the NE end of this island is conspicuous. A light is shown from the SW and highest part of the island. A radiobeacon is located at the light. A signal station stands near the light structure.

The SW part of the island is used as a quarantine station, the buildings being near its SW end; on its N side there is a pier where vessels drawing up to 3m can berth alongside. A lifeboat is stationed at the island.

There is good anchorage about 0.3 mile N of the pier in a depth of about 7.3m, mud, but the tidal currents have been observed to run at a rate of 3 knots in this position.

Vessels can also anchor in suitable depths anywhere around the island, but care must be taken to avoid the vicinity of the submarine cables indicated on the area chart.

5.5 Bajo Cumberland (34˚57'S., 55˚57'W.), with a least depth of 5.5m, is about 0.5 mile WSW of the island.

A reef extends about 0.5 mile N from the NE end of the island.

Canal de Flores, the passage between Isla de Flores and the mainland NW, is much encumbered by the dangers off Punta Manso. A vessel using this passage should pass about 2 miles N of the island and then keep nearer to it than to the mainland.

The tidal currents in the passage are stronger and more irregular than those S of the island, and the latter route is preferable. The height of the tide is influenced by the wind.

A sunken wreck, dangerous to navigation, lies on the edge of the 20m curve about 35 miles ESE of the light on Isla de Flores.

A dangerous sunken wreck, the existence of which is doubtful, lies in a position about 6.7 miles SSW of the light on Isla de Flores.

Banco Ingles, a dangerous shoal, is 16 miles long. The N end which is well defined, lies about 48 miles WSW of Punta del Este, and about 11 miles S of Isla de Flores.

A ridge on the N part of the shoal is about 4 miles long in a N to S direction and has a least depth of 0.3m; the sea sometimes breaks.

The shoal is composed of black sand except for its SW part, where there are stones in a depth of 5.5m.

A detached 4.9m shoal, with 6.7 to 8.2m depths around it, is 8.5 miles S of the S end of the above ridge.

A detached 8.2m shoal, with 11.3 to 16.4m depths around it, is about 10 miles ESE of the W end of Banco Ingles.

There are depths of 10.9m and 12.8m close off the N end of Banco Ingles; the E side of the bank has a more gradual slope.

The approach to the bank is indicated by soundings. In the channel N of the bank the bottom is very soft mud and depths are more than 10.9m until W of the bank.

If a vessel anchors near Banco Ingles for too long, there may be some difficulty in breaking out the anchor because of the stiff nature of the bottom.

Lighted buoys, lying well off Banco Ingles, mark the general area of the bank. The slope of Banco Ingles is subject to change.

5.6 Banco Arquimedes (35˚13'S., 56˚06'W.), with a least depth of 4.5m, is a small sandy shoal lying from 16.5 to 19.2 miles SSW of Isla de Flores.

About 8 miles W of the N of it, the depths increase regularly over a bottom of mud. It should not be approached, unless in a vessel of light draft, in depth less than 9.1m.

The bank is marked by lighted buoys to the N and W; but because they are exposed to strong S winds their position is not always reliable and caution is advised.

The tidal currents in the vicinity of Banco Ingles have been observed to run in all directions, but generally more E and W than N or S; the greatest rate observed did not exceed 1.5 knots.

5.7 Banco Ortiz borders the coast E of **Punta San Pedro** (34˚38'S., 57˚51'W.) for about 40 miles and, with an average width of 18 miles, projects another 40 miles SE down the middle of the estuary nearly to a line of bearing between Montevideo and Punta Piedras.

The SE part of the bank is separated from Banco Piedras by a channel about 8 miles wide, with a least depth of 5.8m, forming the bar of Rio de la Plata through which Canal Punta Indio has been dredged.

The N half of the bank has general depths of 2.1 to 3.6m; the S half is nearly a fathom deeper. The nature of the bottom is sand and mud, but there is some hard bottom and rock near the N shore between Rio Rosario and Rocas de las Pipas.

Banco Ortiz can be approached on all sides by sounding, as the depths decrease gradually and the muddy bottom, which is found in the channels, becomes mixed with sand.

A vessel should not proceed into depths of less than about 5.5m.

Quebrada del Banco Ortiz, a channel for light draft vessels, leads across the S part of Banco Ortiz in about 34˚52'S.

Lighted buoys are moored near the E and W ends of the channel. An obstruction, marked by a small white buoy, is about 1 mile W of the E lighted buoy. Navigation of this channel is described later in this section.

Directions.—When heading for Montevideo, from a position with the light on Island Lobos bearing 000˚ and distant 4 miles, a course of 275˚ for about 66 miles leads 4.25 miles S of Isla de Flores and 4 miles S of Punta Brava to the position of the entrance buoy at the S end of the dredged channel leading into the Port of Montevideo.

This track leads clear of all dangers and over a least charted depth of 9m about 1 mile E of the entrance buoy.

This channel is reported (1995) no longer maintained, and the depth cannot be confirmed.

When heading for Buenos Aires, from a position with light on Isla de Lobos bearing 000˚ and distant 4 miles, a course of 273˚ for about 50 miles leads to a position with the light on Isla de Flores bearing 340˚ and distant 6 miles.

Then a course of 246˚ for about 23 miles leads to the position of Practicos Recalada Light Vessel at the seaward entrance of Canal Punta Indio.

This track leads clear of all dangers and over a least charted depth of 9m about 2 miles ENE of the light vessel.

Navigation of Canal Punta Indio is described later in this section.

Both of the described tracks lead N of Banco Ingles and Banco Arquimedes.

Aeronautical radiobeacons, of use to shipping, transmit from positions about 10 miles NW and 54 miles WNW, respectively, of Punta del Este.

5.8 Paso Norte Channel lies parallel with the N shore of Rio de la Plata, between it and Banco Ortiz. It is frequented only by coastal and other vessels of light draft, as there are depths of only 3.6m off the mouth of Arroyo Cufre and near Rocas de las Pipas when the river level is low.

A vessel proceeding from Montevideo through Paso Norte, after passing La Panela Light and Banco Santa Lucia Light Buoy, should steer NW and keep about 5 miles offshore, so as to pass S of Banco Jesus Maria Light Buoy.

Then course should be altered to pass about 1 mile SW of Banco Arazati Light Buoy, when the depths will decrease gradually to about 3.6m.

From a position 1.5 to 2 miles SW of the mouth of Arroyo Cufre, the channel turns W. After passing **Banco Cufre Light Buoy** (34˚28'S., 57˚10'W.), a vessel should keep near the shore and then steer to pass S of Piedras del Sauce Lighted Buoy. From Punta Artilleros Lighted Buoy, course should be shaped so as to pass S of Rocas de las Pipas and Roca Barriles, giving these rocks a wide berth, when the least depth will again be about 3.6m.

When past Roca Barriles, a vessel can close the shore to within 0.5 mile and follow it to the roadstead at the Port of Colonia, passing S of the breakwater at Puerto Franco. Punta San Pedro should be rounded at a distance of about 0.2 mile, bearing in mind that the tidal currents are set on to this point.

Vessels of less than 2.7m draft can proceed from Montevideo to Buenos Aires through Quebrada del Banco Ortiz, which leads across Banco Ortiz in an almost direct line, but vessels of greater draft must use Canal Punta Indio.

Tides—Currents.—During the rising tide, the tidal current E of Banco Ingles sets N. Between Isla de Flores and the N shore of the estuary, the tidal current sets W inclining WSW parallel with the shore; between Isla de Flores and N end of Banco Ingles, it sets W inclining WNW.

These two currents unite W of Isla de Flores and set through the outer roadstead at Montevideo in a NW direction. Over Banco Ingles and E of its ridge, the current sets between SSW and SW, sweeping W around the SW part of this shoal and then NW toward Banco Arquimedes.

Near La Panela and the N shore, the tidal current sets between NW and W. About 15 miles N of Banco Arquimedes, the currents set ENE and ESE in a contrary direction to the branch which enters S of Isla de Flores, and deflects that branch WNW of Banco Ingles. Over the S and central parts of Banco Ortiz it sets NW, and near the N shore it sets W.

During the falling tide, the current sets between ESE and SE over Banco Ortiz. Banco Ingles divides the current into two branches, one setting SE and the other SW.

Abreast Montevideo the current sets ESE and maintains this direction in the passage between Isla de Flores and Banco Ingles. Between Isla de Flores and the N shore of the estuary, the current sets SW and then turns to join the current setting between ESE and SE, S of that island.

Punta del Este to Montevideo

5.9 **Punta del Este** (34˚58'S., 54˚57'W.) is the S extremity of a promontory which projects about 2 miles SW from the general line of the coast and is bordered by some sand dunes. About 0.3 mile N is a dark hill, about 18m high, from which a light is shown. The promontory is fringed by above-water and sunken rocks extending as far as 183m offshore in places.

The mountains Pan de Azucar and Sierra del a Ballena are visible in clear weather NW of Punta del Este before it is sighted at 8 to 10 miles offshore.

The point has been reported to give good radar returns as far as 10 miles.

A conspicuous chimney, which is tall and light brown in color, is about 3 miles NNE of Punta del Este. There is a prominent hotel about 1 mile NE of the point.

A signal station is close N of the light structure on Punta del Este. A number of submarine cables, the routes of which are indicated on the chart, are landed nearly 1 mile NE of the point.

Bajo Silvia, with a least depth of 12.5m and composed of sand and rock, lies about 2 miles SW of Punta del Este.

Bajo Nuevo, a shoal with a least depth of 6.8m, lies about 1 mile WSW of Punta del Este. The bottom near this shoal is rocky and uneven and the depths vary from 12.8 to 21.9m.

Bajo del Este, with a rock awash in its center, lies about 0.3 mile to 0.5 mile W of the S extremity of Punta del Este, and the sea always breaks over it.

A dangerous wreck lies on the W part of this reef. The narrow passage between Bajo del Este and Punta del Este has a depth of about 7.3m.

Isla de Lobos and Banco Ready, about 5 miles SE and 4.75 miles SW of Punta del Este, have already been described in paragraph 5.3. Within a distance of about 9 miles SE of Isla de Lobos, the light on Punta del Este is obscured by the summit on that island when bearing about 315˚.

Bahia de Maldonado (34˚56'S., 55˚00'W.) is entered between Punta del Este and **Punta Ballena** (34˚55'S., 55˚03'W.), and it is exposed to SW winds which raise a heavy sea. Part of the bay is sheltered from these winds by Isla Gorriti, located 1.25 miles NW of Punta del Este and described in paragraph 5.10, but the tidal currents in the two entrances formed by the island cause much inconvenience.

A prominent building is near the root of a ruined pier about 3.2 miles NNW of Punta del Este. The cathedral of Ciudad de Maldonado, with a cupola and two square towers, stands 1 mile NE, but is screened by trees on some bearings.

Punta Ballena, which has the appearance of a whale, is the S end of a range of rocky hills, one of which has a prominent patch of white. There are some caves in the point. A beacon near the extremity of the point is a good mark for vessels in the E part of the bay.

There are some above-water rocks off Punta Ballena, and an underwater ledge extends 0.3 mile S from it. A detached rock, with a depth of 4.3m, lies about 0.4 mile SSW of the point and should not be approached within 0.5 mile.

Tides—Currents.—The tides in Bahia de Maldonado are affected by the wind. Fresh S winds raise the water level at times as much as 1.8m, and N winds lower it.

Generally, this action takes place before the arrival of such winds in the bay, and they can be forecast to a certain extent.

Another indication is that the temperature of the water rises during N and falls during S winds.

During a rising tide, the tidal stream usually enters the bay W of Isla Gorriti and runs out E of the island. Winds from the W cause a strong current to run E and S around **Isla Gorriti** (34˚57'S., 54˚58'W.), WSW of the point.

5.10 Punta del Chileno (34˚55'S., 55˚01'W.) is rocky with an underwater ledge extending 0.25 mile S.

The remainder of the shore of the bay is clear of dangers and is backed by dunes, those SE of Ciudad de Maldonado being higher than those NW of the town.

Laguna del Diario lies a short distance NE of Punta del Chileno. In times of flood, this lagoon forces a channel through the beach to the sea.

Isla Gorriti (34˚57'S., 54˚58'W.), in the SE part of Bahia de Maldonado is low, densely wooded, and composed of sand and rock. There is a cove with a sandy beach on its W side. A bank of sand with occasional below-water rocks extends up to about 0.3 mile off the island.

There are two piers on the E side of the island situated close to each other about 0.3 mile N of the SE point of the island.

Another pier is situated at the head of a small bay on the N side of the island. The island is marked by a light on its SE point which is only visible between bearings of 097˚ and 357˚.

Bajo Mostyn, with a least depth of 4m, is 0.3 mile E of **Gorriti Light** (34˚58'S., 54˚58'W.).

Bajo del Monarca, a rocky shoal with depths from 5.2 to 8.8m, lies with its shallowest part about 0.8 mile NNW of Punta Britos, the NW extremity of Isla Gorriti. It is marked on its NW side by lighted buoy. The passage between this rock and the island should not be used.

There are depths of 4.6m and 5.2m up to about 0.3 mile N of Isla Gorriti.

Bancos los Banquitos, a group of sandy shoals with a least depth of 3m, lie up to about 0.8 mile E of the NE point of Isla Gorriti. They are marked on the NE side by a lighted buoy.

Anchorage in Bahia de Maldonado is recommended about midway between the N end of Isla Gorriti and the shore, in depths of 8 to 9m, sand over hard mud, with Punta Ballena bearing 290˚ and Punta Britos bearing between 199˚ and 232˚.

This anchorage, known as Puerto de la Pastora, is protected from S winds which sometimes blow with great violence and the holding ground is very good. Because the anchor soon becomes foul, a vessel intending to remain for any length of time should moor with two anchors on a SW heading.

Anchorage is available for small craft near the entrance to Puerto de Punta del Este, 137m from the breakwater head, in depths of 6m, hard sand.

This anchorage is sheltered from all winds except those from between W and SW, but winds from NW may raise a moderate sea.

These anchorages are used by vessels unable to berth alongside at Puerto de Punta del Este to work cargo into lighters.

Directions.—When approaching Bahia de Maldonado from E, pass on either side of Isla de Lobos, avoiding the dangers off it. Punta del Este can be easily identified by the light tower. From a position S of this island, Ciudad de Maldonado will be sighted.

Also prominent is a 50m high building and 2 water tanks lying 1 mile and 0.7 mile, respectively, NE of Punta del Este.

In addition, Monte Pan de Azucar and Sierra de las Animas, to the NW, will probably be visible.

The channel between Isla Gorriti and Punta del Este is restricted by Baho del Este, Bajo Mostyn, and Banco los Baquitos and is dangerous due to the strong tidal streams running through it. Between the NE end of Isla Gorriti and the mainland, the depths are very uneven, but the channel NE of Bancos Los Banquitos is about 0.2 mile wide, with depths of from 6.5 to 10m.

It can be used in fine weather by small craft with local knowledge. During fresh S winds, the sea breaks right across the channel. Small craft with local knowledge sometimes use the passage between Bajo del Este and Punta del Este; but the tidal streams run very strongly here, and this passage should be avoided by strangers even in good weather.

Having passed Isla de Lobos, steer W and do not bring Punta del Este light tower to bear more than 045˚ until Punta Britos bears 020˚, so as to clear Banco Sylvia and Bajo Nuevo. When Punta Britos has reached the above bearing, alter course N, passing NW of Bajo del Monarca lighted buoy, and continue until Punta Ballena bears 282˚, then steer for the anchorage.

Avoid anchoring within 0.4 mile of the ruined pier N of Isla Gorriti.

5.11 Puerto de Punta del Este (34˚51'S., 54˚57'W.) is a small seaside resort harbor on the NW side of Punta del Este. The port, which is protected by a 0.25 mile long breakwater on its W side, consists of a wooden pier with a concrete head,

which has depths of 4m alongside. Depths decrease rapidly on the W side of the pier.

There are quays for small craft on both sides of the root of the pier, and there are several mooring buoys for small craft in the harbor. The Customs house, a large stone building, stands at the root of the pier.

The port is reported to be marked by a light at the head of the breakwater. There is a lifesaving station at the port.

Punta Ballena to Punta Manso

5.12 Ensenada del Portrero (34˚55'S., 55˚08'W.) is entered between Punta Ballena and **Punta Rasa** (34˚54'S., 55˚13'W.), 9.5 miles W. Laguna del Sauce lies within the bay and has an outlet into it, and its vicinity is subject to inundation. The bay is clear of dangers and is easily identified by its beach of white sand.

Anchorage is recommended in the bay during offshore winds in depths of 9 to 11m, hard sand, 0.3 mile to 1.2 miles offshore. A berth, with good shelter from strong E winds, is situated 1.25 miles NNW of Punta Ballena and 0.5 mile offshore in depths of 9 to 13m.

Capitan Curbelo Aero light is occasionally shown from a white square stone tower and dwelling, 15m high, 4.75 miles NW of Punta Ballena.

Punta Negra and Punta Iman lie 1 mile W, and 2.5 miles WNW, respectively, of Punta Rasa, the three points together forming a cape. They are steep and rocky with sandy coves between them, and rise to high land which is joined by Monte Pan de Azucar.

Punta Negra is marked by a light. A stranded wreck lies 18 miles S of Punta Negra.

Montevideo Maritime Movement Control System is in operation W of the meridian of 55˚30'W; vessels are required to report on crossing this meridian and also when abeam of Isla de Flores.

5.13 Ensenada de Piriapolis lies between Punta Iman and Punta de los Burros, 2.5 miles NNW. The latter point is low and fringed by a reef. The shore of the bay is composed of fine compact sand. The seaside resort of **Piriapolis** (34˚52'S., 55˚15'W.) stands behind the S part of the bay.

A small white chapel, which is cylindrical and looks like a tank from afar, stands at an elevation of about 130m on the summit of Cerro del Ingles, 0.75 mile NE of Punta Iman; it can be seen at a distance of about 10 miles offshore. There is a large and prominent hotel in Piriapolis, 1.5 miles N of Punta Iman.

Puerto de Piriapolis is formed by a breakwater extending about 0.1 mile NW from the SE shore of the bay. On its NE side there is a wharf 35m long with a depth of 4m alongside.

Vessels drawing up to 4.3m can anchor under the shelter of this breakwater.

Caution.--High speed ferries operate between Piriapolis, Montevideo, and Buenos Aires

5.14 From Punta de los Burros, the coast trends WNW for 5.5 miles to Punta Animas which is fringed by underwater rocks to a distance of 1 mile.

Monte Pan de Azucar and Sierra de las Animas, the highest and most prominent summits near the coast in this vicinity, are located 3.5 miles NE and 6.5 miles N, respectively, of Punta de los Burros. The former is an almost regular cone, 388m high, and has a conspicuous cross, about 32m high, on its summit. The latter is 499m high, and has a flattened summit with a slight depression in the form of a saddle which is visible when bearing about 295˚.

From Punta Animas to Punt a **Piedras de Afilar** (34˚48'S., 55˚32'W.), 7 miles W, the coast is backed by two hills, also known as Piedras de Afilar. The N and higher of these hills is 103m high and rises 5 miles NNW of the point. The slope of the S hill forms the point itself which is fringed by steep rocks.

Arroyo Solis Grande flows into the sea 0.75 mile NW of Punta Animas. Its mouth, which is about 150m wide, is obstructed by a sandbank and can only be entered by boats.

Bajo Solis, parts of which are above water, is 4.5 miles WSW of Punta Animas and 1 to 2 miles offshore. The sea always breaks over it.

The passage between this danger and the coast has depths of 5.5m, coarse sand and mud.

Islotes las Toscas (34˚49'S., 55˚34'W.), are two groups of islets and rocks which dry, 2 miles SSW and WSW of Punta Piedras de Afilar. The W group lies 1 mile offshore.

There are depths of 5.5m between these groups. Large numbers of gulls nest on the islets.

5.15 Punta Pedro Lopez (34˚47'S., 55˚38'W.), which is divided into two points and fringed by reefs, lies 6 miles W of Punta Piedras de Afilar.

Punta Piedras Negras, off which a rocky bank extends 0.75 mile, lies 5.5 miles farther W.

The mouth of Arroyo Solis Chico lies 2 miles WNW of Punta Pedro Lopez.

In times of drought it is completely closed by sandbanks, but after rains, the river breaks through these banks with great force and produces a noise which can be heard in the distance.

Anchorage may be obtained during offshore winds in depths of 4 to 5.5m, mud, in Bahia de Santa Rosa, situated close W of Punta Piedras Negras. The beach in the bay is steep-to and composed of hard sand.

Between Punta Piedras Negras and the mouth of Arroyo Carrasco, 15 miles WSW, the coast consists of Playa de Santa Rosa, an extensive beach of coarse sand backed by dunes 3 to 5m high. There are depths of 4.6m, 0.25 mile offshore.

The sea breaks heavily on the beach during winds from between the E and S, and the strong currents which then prevail tend to set a vessel onshore.

Arroyo Pando flows into the sea through this beach, 6 miles WSW from **Punta Piedras Negras** (34˚47'S., 55˚46'W.)

Playa Carrasco, a continuation of Playa de Santa Rosa and of similar formation, extends from the mouth of Arroyo Carrasco to Punta Manso, 2.75 miles WSW. There is a conspicuous hotel NE of the point.

Carrasco Aerobeacon is shown from the control tower 21m in height, situated at this airport, 4 miles NE of Punta Manso.

Bajo Sara (Sara Bank), a rocky patch with a least depth of 2.7m, lies 3 miles SE of **Punta Manso** (34˚54'S., 56˚04'W.)

Bajo Bump, a rocky patch with a least depth of 0.9m, lies 2.5 miles ESE of Punta Manso. The sea seldom breaks over it.

The passage between this shoal and Bajo Sara to the S, has depths of 7m.

Roca de las Pipas (34˚54'S., 56˚02'W.), a group of rocks about 3m high, lie from 1.75 to 2.25 miles E of Punta Manso.

They are surrounded by a rocky bank, with depths of 1.8 to 4.6m. Roca Mark, the E most of the group, is visible for about 3 miles and shows up well against the white beach.

Bajo Forest-King, which dries, lies 1.25 miles SE of Punta Manso; it rises abruptly from depths of 6.7m where the bottom is mud. There is a small shoal, with a depth of 4m, 0.2 mile SW of this danger.

Islote de la Luz, about 1.5m high, is the largest of a group of islets surrounded by rocky and uneven ground, 0.4 mile SE of Punta Manso.

Isla de Flores, Banco Ingles, Banco Arquimides, and other off-lying dangers have been discussed previously in paragraphs 5.4 through 5.7.

Punta Manso to Punta Santa Teresa

5.16 Punta Gorda (34˚54'S., 56˚05'W.), 0.75 miles W of Punta Manso, is low and rocky. It is backed by a high ridge which serves to identify it.

From Punta Gorda to Punta Brava, 4.5 miles SW, the coast forms a bay indented by a number of points and coves.

Isla de las Gaviotas lies within the bay, close S of Punta Descanso, which is located about 1 mile to the W of Punta Gorda.

The passage between this islet and Punta Descanso can be used by small craft drawing less than 1.8m.

Puerto del Buceo (34˚54'S., 56˚08'W.) is a small port consisting of a bay enclosed by breakwaters.

It is a yachting center and there are usually a large number of yachts at anchor. A large part of the bay is kept dredged to a depth of about 3m. The bottom is muddy sand.

There are two wharves on the inner side of the W breakwater with depths of 2.4m alongside. The yacht club, which has a tower, stands near the root of the W breakwater with a marina close by it.

Lights are shown from the heads of both breakwaters and from the tower of the yacht club.

Bajo Coquimbo, a rock, with a depth of 1.2m, is about 0.2 miles ESE of the head of the E breakwater at Puerto del Buceo. Bajo Flores, awash, is about 0.1 mile ENE of the same point.

Rocas Buen Viaje, with depths of less than 1.8m, lie 1.5 miles E of Punta Brava. It is circular in shape and is about 0.3 mile in diameter. There is an above-water rock in the middle of this reef. The passage between these rocks and the mainland has a maximum depth of 4.6m in the fairway. A wreck is stranded on these rocks.

5.17 Ensenada de la Pocitos (Playa de los Pocitos) (34˚55'S., 56˚09'W.) is a cove entered NE of Punta Trouville, a rocky point 1.25 miles NE of Punta Brava. Small craft drawing up to 2.7m can anchor in the cove in a fine sand bottom. A lighted radio mast is on Punta Trouville.

Punta Brava (34˚56'S., 56˚10'W.), marked by a light, is low and fringed by above and under-water rocks which extend SSW from it. The rising ground within the point is covered by buildings which form part of Ciudad de Montevideo. A conspicuous hospital stands 2.75 miles N of the point. The light on the point is not easily distinguished from the S.

From Punta Brava to Punta Santa Teresa, 2.75 miles WNW, the coast is rocky but clear of dangers. A tall chimney stands on the latter point. Dique Maua (Mava), a dry dock with a tower close to it, is 0.6 mile E of Punta Santa Teresa.

A spoil ground, marked by a lighted buoy, is 2.25 miles WSW of Punta Brava.

A sewer outfall, marked by lighted buoys, extends 1.5 miles S from Punta Brava. A prohibited entry area, best seen on the chart, surrounds the outfall.

Bahia de Montevideo

5.18 Bahia de Montevideo (34˚54'S., 56˚14'W.) is entered between Punta Sarandi, 0.3 mile NW of Punta Santa Teresa, and Punta Lobos, 2 miles W. The bay is sheltered from winds from W through N to SE.

Puerto de Montevideo (34˚54'S., 56˚13'W.)

World Port Index No. 13120

5.19 Puerto de Montevideo is the port of Ciudad de Montevideo, the capital of the Republic of Uruguay.

Winds—Weather.—The climate of Montevideo is healthful. The average temperature for the winter is about 11˚C; for spring, 18˚C; for summer 22˚C; and for autumn 16˚C; the extreme maximum 36˚C; and the extreme minimum 1˚C.

The prevailing wind direction is N from April to August and E during the rest of the year. Winds of up to 60 knots can spring up suddenly from the SW, especially in the early morning hours.

Rain occurs throughout the year with the heaviest precipitation in May and October.

Tides—Currents.—The mean HW interval at Montevideo is 4 hours 2 minutes; springs rise 1m and neaps rise 0.7m.

Winds from E, SE, and SW raise the water level in the bay, the increase being generally from 1.2 to 1.8m, occasionally 2.4m, and has been known to reach 4.4m.

Winds from the opposite quarters lower the water level which sometimes falls as much as 1m in Rio de la Plata.

There is at times a considerable difference in level on opposite sides of the estuary. The rise in level is less noticeable at Montevideo than farther out in Rio de la Plata.

Tidal currents are only felt in Rada de Montevideo, where they run E on the ebb and W on the flood at a mean rate of 1 knot.

Strong S winds force much water into the bay; 3 or 4 hours after the wind has risen, the water begins to flow out of it and causes a countercurrent to run outward round Punta Sarandi.

A vessel leaving the bay on its E side after a Pampero should proceed with caution as this wind causes a strong SE current which is felt immediately after passing Punta Sarandi.

Cross currents up to 2 knots have been experienced in the dredged channel.

Depths—Limitations.—Rada Exterior, the outer roadstead, lies about 6 miles S of Punta Sarandi and has depths from 8 to 10m, soft mud.

Rada Interior lies between **Punta Lobos** (34˚54'S., 56˚15'W.) and Escollera Oeste, 1.25 miles E, and has depths of up to 4.6m. It has better shelter than Rada Exterior, but is still somewhat exposed.

A channel, about 5 miles long and maintained to a depth of 10m, runs in a 000˚ direction to the breakwater heads; it is liable to silt, but the bottom is soft mud.

A dredged and buoyed channel, entered between the lighted buoys at Km 13.5, about 4 miles S of Punta Brava, leads to the entrance channel to Puerto de Montevideo.

The seaward end of the channel is marked by a lighted buoy moored on the axis of the channel, but which is liable to drag.

The channel itself is marked in accordance with the IALA Maritime Buoyage System (Region B) by lighted buoys which are moored a short distance outside its edges.

A stranded wreck, marked by buoys, lies close W of the channel. Extensive shoaling has been reported in its vicinity.

The dredged entrance channel leads to a dredged outer harbor from which two basins for ocean-going vessels are to the ENE, and another dredged channel leads from the outer harbor NW through the bay to the ANCAP facility.

The remainder of the bay is comparatively shallow with many charted dangers and can be used only by smaller vessels.

Puerto de Montevideo consists Antepuerto (outer harbor), Darsena Fluvial, Darsena I (Basin No. 1), Darsena II (Basin No. 2), Zona de Cabotage, and Darsena La Teja.

Darsena La Teja is located on the N side of the bay while the other areas are all located on the S and SE sides of the bay.

There are also numerous small piers and quays on both sides of the bay. The Antepuerto and Darsenas I and II are subject to silting and are dredged periodically to a depth of 10m; the bottom is of very soft mud so that ships are in no harm from grounding.

The Antepuerto is an anchorage, protected from W by Escollera Oeste and from S by Escollera Sarandi, situated at the N end of the dredged channel by which the port is approached. It contains 16 anchor berths which are used by ships, mainly in the coal and salt trades, to work cargo from lighters. A grain transfer area lies close E of the N part of Escollera Oeste. The corners of this area are marked by buoys.

Darsena Fluvial lies at the SE end of the Antepuerto between Muelle Fluvial and Muelle A. It is subject to silting and is dredged periodically to a depth of 5m.

It is used by river craft and other vessels of light draft, including ships of the Uruguayan Navy which usually berth on Muelle Fluvial. The terminal of the ferry from Buenos Aires stands on Muelle A.

The head of Muelle Fluvial forms Muelle Escala, a quay length of 288m long with depths of 10m alongside. It is not sheltered and is used only when the port is congested. Vessels lying at it should pay particular attention to their moorings.

Darsena I lies E of Darsena Fluvial, between Muelles A and B. It has a total length of 1,092m and is used by foreign ships.

It has depths between 8.5 to 10.1m. The W side of Muelle A is 382m long, while the E side of the pier is 306m long.

Darsena II lies E of Darsena I, being separated from it by Muelle B. It has a total length of 722m, and is also used by foreign ships. There is a berth where tankers, including those carrying vegetable oils, can discharge at Muelle Florida at the E end of this basin. There is also a refrigerated warehouse on this quay. Depths in the basin are 8.2m. Muelle B is 294m long on its W side and 328m long on its E side.

Zona de Cabotage, the coaster's harbor which is dredged periodically to a depth of 5m, lies between the E end of Darsena II and the E shore of the bay, where less water than charted was reported. It is sheltered from N by Espignon F, a spur extending from the E shore of the bay, and by Dique de Cintura, a breakwater with two spurs extending S, which also shelters Darsenas I and II.

The NE part of Bahia de Montevideo is shallow and has several shoals which are marked by buoys and beacons. Its shore is fringed by numerous quays and small piers which are only accessible to vessels of light draft.

Darsena La Teja, which contains the ANCAP oil terminal and serves other industrial plants in the vicinity, lies between the mouths of Arroyo Pantanoso and Arroyo Miguelete at the N end of the bay. It is approached through a buoyed channel dredged to a depth of 9m which extends NNW from the NE corner of the Antepuerto.

The N berth is a 280m long tanker berth with an alongside depth of 9.1m. The S berth is 249m, with a depth of 6.7m alongside, and is used for discharging coal and cement.

Moorings have been laid S of this basin from which cables have been led over its S pier; when a S gale blows, vessels lying at this pier can attach their mooring wires to these cables thus reducing the strain on the structure of the pier.

The largest vessel that can be accommodated in Darsena La Teja has a maximum length of 241.5m, a maximum beam of 32.3m, and a maximum draft of 8.5m.

Aspect.—Ciudad de Montevideo stands on the E shore of Bahia de Montevideo and Villa del Cerro on the W side of the bay on the slopes of Cerro de Montevideo which rises to an elevation of 140m. This hill, which is conical and prominent, is the best mark in the vicinity for making a landfall. Fortaleza General Artigas, now a military museum, stands on the summit.

Cerro de Montevideo Light is shown from a lantern, 8m high, on the flat roof of Fortaleza General Artigas on the summit of the hill.

The cathedral, which has three towers, one of which is lower and broader than the others, is over shadowed by two very tall buildings, one of which, Palacio Salvo, 0.3 mile E, is surmounted by a tower on top of which is a television transmitter.

Other prominent objects are two chimneys of the oil refinery in the N part of the bay, one of which burns a flare which is sometimes visible for 25 miles, and a group of six chimneys, painted red and white in bands, at the power station situated on the E shore of the bay 1.75 miles NE of Punta Sarandi (34˚54'S., 56˚13'W.).

A television tower, 127m high, the upper part of which is painted red and white, stands 1.75 miles E of the same point; a red obstruction light is shown from the top of the tower. The tower of the custom house, 0.3 mile NE of Punta Sarandi, is also conspicuous.

Pilotage.—Pilotage is compulsory except for vessels flying the Uruguayan flag. Pilots board from a cutter painted red, or from a tug, near the outer end of the dredged channel leading to the port. Vessels should inform the port authority through their agents of their expected time of arrival 72 hours in advance,

and this should be confirmed by 24 hours advance notice. The pilot station is equipped with radiotelephone.

Montevideo is located in the SW zone of the Uruguay Vessel Traffic System which extends NE to the Brazilian border, with surveillance radar coverage reaching up to 24 miles offshore. The other two zones are Ponta del Este and La Paloma.

The Maritime Movement Control and Information System is administered by the Uruguayan Authorities. It receives and promulgates information with the aim of controlling and assisting vessels navigating in the approaches to, and in the port of Montevideo.

The Spanish or English languages are used in messages between vessels and the Control Center.

Vessels are to report to Colonia Control at following points:

1. Abeam of Punta Rosario (34˚26.5'S., 57˚20.8'W.).
2. Abeam of Puerto Sauce (34˚26.4'S., 57˚26.5'W.).
3. Abeam of Roca Barriles (34˚30.0'S., 57˚42.5'W.).
4. Abeam of Puerto Colonia (34˚28.5'S., 57˚50.5'W.).
5. Abeam of Isla Farallon (34˚29.1'S., 57˚55.0'W.).
6. North end of Barra de San Pedro.
7. Abeam of Punta Martin Chico (34˚09.9'S., 58˚12.6'W.).

Regulations.—The speed of vessels must not exceed 8 knots in the dredged channel, 6 knots in the **Antepuerto** (34˚54'S., 56˚13'W.), and 4 knots in the inner harbor. Towage is compulsory for sailing and for other vessels unable to maneuver at these speeds.

Vessels arriving must display their national flag and the quarantine flag until pratique is given.

The roadstead comprises the waters inside the line joining Punta Brava and Punta Yeguas, about 8 miles WNW.

The port comprises the waters inside the artificial harbor works.

Vessels with explosives or inflammables on board should display flag B of the International Code of Signals by day and exhibit one red light at night and if required by the port authorities, must discharge their cargo in the Antepuerto or in Rada Exterior.

Vessels arriving with damaged hulls or spars may not enter port until after an examination by the port officials.

Vessels anchoring temporarily, and not requiring the visit of the sanitary officer, must display their national flag and their signal letters in the International Code of Signals for four hours during daylight; the remainder of the four hours due at sunset being made up after sunrise on the following day.

During fog or thick weather, vessels must anchor in the roadstead until weather clears.

Vessels entering Puerto de Montevideo should display the quarantine flag of the Health officer before communicating with the shore or shipping.

If from a port where contagious diseases exist, a vessel will avoid delay by anchoring off **Isla Flores** (34˚57'S., 55˚56'W.) before proceeding to an anchorage off Montevideo, as fumigation is carried out there before pratique is granted.

Pratique may be requested by radio, not less than 24 hours before arrival.

Signals.—All vessels passing through the channel, when at a distance of about 0.1 mile from a dredge, must stop and sound one blast on the whistle or siren, and then await the signal to proceed.

The dredge will indicate to a vessel that the passage is clear by displaying flag "P" of the International Code at the foreyard on the side on which the vessel should pass.

At night, in addition to exhibiting the lights of a vessel not under control, the dredge will exhibit at the signal yard three white lights if the vessel should leave her to starboard and three red lights if she should leave her to port.

Weather signals are displayed from the mast of the Meteorological Station situated on top of one of the university buildings on **Punta Sarandi** (34˚54'S., 56˚13'W.).

Weather information, including a forecast for the following 24 hours, is signaled from this station daily at 1600.

The height of the barometer (in millimeters), the temperature, and the force of the wind are made in International Code by the station if requested. The barometer is located at a height of 25m above mean sea level.

Anchorages.—Outer anchorages for topping or lightening of deep draft vessels.—Alpha Zone lies in the approaches to Montevideo; it stretches 3 miles E-W and 2 miles N-S centered at 35˚03'W, and 56˚02'W, as seen on the chart. This area is in the vicinity of Practicos Recalada seareach buoy and used by vessels for topping-off grain cargo to a draft upto 12.2m in brackish water.

Bravo Zone is located in the vicinity of 35˚30'S, between the meridians of 56˚30'W, and 56˚36'W for incoming vessels with a maximum draft of 12m to await clearance and free pratique.

Charlie Zone covers in the area bound between 35˚59'S to 36˚05'W and 56˚30'W to 56˚38'W for vessels with a maximum draaft of 15.25m in brackish water. This anchorage is for vessels requiring lightening operations prior to a port entry.

Delta Zone is located in 35˚04'S to 35˚06'S and 55˚11'W to 55˚16'W and used by tankers of 15m draft in salt water for lightening before entering the port of Buenos Aires, La Plata, and Campana ports. Bravo Zone and Charlie Zone are mainly used for lightening of tankers before a port entry.

A vessel navigating in Bravo Zone should report anchoring or weighing anchor in Montevideo Roads or elsewhere or within ithe zone, on passing the stranded wreck on the W side of the approach channel, on passing the breakwaters, on anchoring in Antepuerto, on berthing or unberthing in the basins, and on anchoring or weighing anchor in the zone.

In these zones vessels should inform the Control Center of any accident, damage or fire, of any assistance rendered to a vessel in difficulties, the sighting of any unmarked navigational hazard, and of any significant reduction in visibility.

All vessels must obtain permission, which is valid for 15 minutes only, from the Control Center before berthing, unberthing, or anchoring.

Notices to Mariners and Weather Reports are broadcast at intervals by the Control Center. Vessels may request information at any time.

Anchorage in Rada Exterior, the outer roadstead S of a line between Punta Brava and **Punta Yeguas** (Punta Yegua) (34˚56'S., 56˚19'W.), has depths of 8 to 10m, soft mud, and the holding ground is poor. Because of the risk of dragging, vessels should anchor well clear of other vessels.

Rada Interior, the inner roadstead, between Rada Exterior and a line between the N end of the W breakwater and Punta del Rodeo, has depths of up to 4.6m.

This is a more convenient anchorage than Rada Exterior and affords better shelter. The Pampero blows with greatest force from this quarter.

Both of the above anchorages are very exposed and communication with the shore is sometimes interrupted for days. Vessels are advised, if possible, to enter the harbor.

Because the N and NW of the dredged portion of the outer harbor is used as an anchorage for vessels working cargo anchorage may be limited.

Anchorage is prohibited within 0.5 mile of the breakwater or of any light buoys marking the dredged channels.

Because of submarine cables, vessels are prohibited from anchoring E of a line extending due S from Punta Teresa.

Anchorage is not advised W of a line due S from Punta Sayago, because of submarine cables.

Caution.—High speed ferries operate between Piriapolis, Montevideo, and Buenos Aires.

5.20 Punta Lobos (34˚54'S., 56˚15'W.) is the site of a naval dockyard which includes Dique National, the largest dry dock in the port. It is 143.4m long with a 137.2m floor, 18.6m wide, and has a draft of 3.8m.

Another dry dock and two floating cranes up to 80 ton capacity is available. Divers are available.

The entrance to the dry dock is protected on its S side by a mole which extends 91m ESE from the SE side of the point.

A rocky shoal, on which there are several heads with depths of 1.2 to 1.8m, are from 0.1 to 0.3 mile E of the entrance. Its SW side is marked by a beacon.

Dique National can be approached either N or S of the above shoal. The S approach is deeper, but the bottom is hard and the current sets across it from S, especially during S winds, when the rate may exceed 2 knots. This approach is not recommended.

The N approach has a bottom of soft mud. It is marked by a 252˚ range. Vessels having explosives or inflammables on board are prohibited from using the dry dock.

5.21 Punta Yeguas (34˚54'S., 56˚19'W.) is 2.75 miles W of Punta Lobos. Punta Sayago and Punta Tigre are 0.75 mile and 1.25 miles, respectively, ENE of Punta Lobos. All these points are low and rocky and are separated by small coves.

There are many rocks in the W most of these coves. A freezing plant stands on Punta Sayago, and there are two piers on the W side of the point.

Pedra Dellazoppa, with a depth of 1.5m, is about 0.4 mile S of Punta Tigre.

Punta Espinillo, low and rocky, is 7.5 miles NW of Punta Yeguas. A reef extends 0.3 mile W.

An aero light, 182m high, is 3 miles NW of Punta Yeguas and 0.3 mile inland. Three vertical obstruction lights are shown below the light.

Bajo La Panela (34˚55'S., 56˚27'W.), a group of four rocks which dry, are marked by a light. They lie 5 miles S of Punta Espinillo. A dangerous wreck, marked close N by a lighted buoy, lies about 1 mile W of the light on Bajo La Panela.

Submarine cables are laid from Punta Sayago to Punta Atalaya on the S shore of Rio de la Plata. Others are laid from Punta Yeguas, following the line of the N shore and about 5 miles off it to Puerto de Colonia.

Rio Santa Lucia is entered between Punta Espinillo and the coast 4 miles N. Its mouth, which is encumbered by banks, is divided into two channels by Isla Del Tigre, located 3 miles NE of the point. Small craft, with local knowledge, can use the S channel which is about 0.1 mile wide, between the island and Punta Pajonal, situated 2.75 miles NE of Punta Espinillo, which is marked by buoys and lighted buoys. The holding ground off the river mouth is good.

The approach to the S channel of the river is marked by a light 2 miles NNE of Punta Espinillo. There is a lifesaving station on Rio Santa Lucia.

5.22 Banco Santa Lucia (34˚48'S., 56˚30'W.), a sandbank with depths of less than 5.5m formed by silt from Rio Santa Lucia, extends 5 miles S from **Punta Tigre** (34˚46'S., 56˚34'W.). Depths of less than 1.8m extend up to 3.75 miles S from the point. The S extremity of the bank is marked by a lighted buoy.

An area where sand is dredged in the vicinity of the sandbank is marked by four buoys.

From Punta Tigre to **Punta San Gregorio** (34˚41'S., 56˚50'W.), a dark bluff about 30m high, on which stand several houses, 14 miles WNW, the coast consists of sandy cliffs 20 to 30m high, forming a continuation of Barranca Santa Lucia, are E of Punta Tigre.

Between this point and the mouth of Arroyo de San Mauricio, 7 miles WNW, these cliffs are known as Barrancas de San Mauricio. To the W of river mouth they are known as Barrancas de San Gregorio.

From Punta San Gregorio to Punta Jesus Maria, 4 miles WNW, the coast consists of a beach of coarse sand backed by dunes from 6 to 11m high.

Arroyo San Gregorio flows into Rio del a Plata through this beach, 1.25 miles NW of the former point.

Banco Jesus Maria, on a sandbank with depths of less than 5.5m, extends 4 miles SSE from Punta Jesus Maria.

The minimum depth of 1.2m on the bank is 1.25 miles S of the point. The SW side of the bank has a lighted buoy.

From Punta Jesus Maria to **Punta Pavon** (34˚32'S., 57˚04'W.), 11 miles NW, the coast consists of a sandy beach backed by dunes from 9 to 30m high.

The mouth of Rio San Miguel, 2 miles NW of the former point, can be easily identified at a distance of 7 or 8 miles from the offing by the trees and dark brushwood near it, which show up clearly against the sandhills in the vicinity.

A jetty, 600m long, on the outer end of which is a silo, projects SW from Punta Pavon.

Banco Arazati Lighted Buoy, moored 1.5 miles S of Punta Pavon, marks the edge of the coastal bank with depths of less than 5.5m extending from the point.

Between Punta Pavon and the mouth of Arroyo Cufre, a swift stream 6.5 miles NW, the coast forms Rincon de Cufre, a bay backed by remarkable high dunes which rise to an elevation 40m.

Abreast Punta Pavon is the NW end of the relatively deep channel between the coast and the NE edge of Banco Ortiz, which joins the coast here. There is a rather exposed anchorage in the NW end of this channel in a depth of 6.4m. Paso Norte follows the coast W to Colonia.

A lighted buoy marks the bend in Paso Norte, 1.5 miles SW of the mouth of Arroyo Cufre.

5.23 **Punta Rosario** (34˚27'S., 57˚21'W.), 9.5 miles W of Arroyo Cufre, is low, rocky, and difficult to identify. A reef extends 2 miles WSW of the point; a 1.2m shoal patch is near the end.

A lighted buoy, which also marks Paso Norte, is 1.75 miles SE of Punta Rosario.

Arroyo del Rosario flows into Rio de la Plata on the NW side of Punta Rosario. A channel, dredged to a depth of 3m, leads to the mouth of the river and is about 46m wide.

The outer reach of this channel leads in a 049˚ direction for about 0.8 mile and the inner reach leads then in a 067˚ direction for about 0.3 mile to the river mouth. The entrance channel is marked.

The river is navigable by small craft for a distance of 15 miles, and a channel has been dredged to a depth of 2.7m as far as Ciudad de Rosario, 7.5 miles from the river mouth.

5.24 **Puerto Sauce** (34˚26'S., 57˚27'W.) (World Port Index No. 13130) is on the NW side of Punta Sauce, 4.5 miles W of Punta Rosario.

It is the port for Ciudad de Rosario. Punta Sauce can easily be identified by the buildings and factory chimneys of Pueblo Juan Lacaze, which stand near it. Sand dunes, 32m high, rise 1.5 miles N of the point.

A sandbank, with depths of less than 3m and on which there are a number of above-water rocks, extends 1.5 miles S from Punta Sauce and from the coast to the E of that point.

A lighted buoy is about 1 miles SSE of the port and also marks Paso Norte.

The port is sheltered from the S by a breakwater extending 720m W from Punta Sauce. A channel, with a least depth of 3.3m, runs parallel to and about 183m N of the breakwater.

It leads to a wooden pier at its root which has a depth 4m alongside. A light marks the end of the breakwater.

Between Punta Sauce and Punta Artilleros, 4.5 miles W, the coast forms a bay. The river mouth of Arroyo Sauce enters the bay about 2 miles NW of Punta Sauce.

Punta Artilleros (34˚27'S., 57˚32'W.), 50m high, is fringed by drying rocks extending about 0.5 mile S. A lighted buoy is 1.25 miles S of the point and marks Paso Norte.

Ensenada de los Artilleros is entered between Punta Artilleros and a point 6 miles W. Arroyo Artilleros, a small stream, flows into its head 3.5 miles NW of the former point.

A village, which is visible from the offing, stands 3 miles W of its mouth.

Underwater rocks extend 1 mile offshore, 5 miles W of Punta Artilleros. Muelle Platero, a small pier, projects from the shore abreast of these rocks.

Punta Riachuelo (34˚28'S., 57˚44'W.), 9.5 miles W of Punta Artilleros, is rocky. Rocks, awash and underwater, extend about 0.1 mile W.

5.25 **Rocas de las Pipas** (34˚29'S., 57˚41'W.) consist of two groups of rocks which dry. Pipas de Afuera, the outer group, is 2.75 miles ESE of Punta Riachuelo, and Pipas de Adentro, the inner group, lie 3.5 miles E of the point. A lighted buoy is about 0.7 mile SW of Pipas de Afuera.

Roca Barriles, with a depth of 2.4m, is 2 miles WSW of Pipas de Afuera.

Arroyo Riachuelo flows into Rio de la Plata, 0.5 mile NW of Punta Riachuelo and is navigable by ships of shallow draft.

The entrance is protected on each side by a breakwater. A channel about 0.3 mile long leads in a N direction to the entrance between the breakwaters and is dredged to 4m.

A light is shown from a black tower on piles, situated on the W bank of the river 0.3 mile N of the head of the E breakwater, and a lighted buoy is at the S end of the approach channel to the river.

From Punta Negra to **Punta San Pedro** (34˚28.5'S., 57˚51.2'W.), the W extremity of the promontory on which stands Ciudad de Colonia, the coast is fringed by rocks with depths of less than 1.8m, extending up to 183m offshore, Punta San Pedro is high and steep on its S side.

Muelle General Rivera, a concrete pier with depths of 4.6m alongside its head, is situated 0.75 mile WNW of Punta Negra and is about 183m long. There is a ruined pier 1.25 miles farther W, 0.2 mile W of the mouth of Arroyo de la Caballada.

Caution.—Banco de las Pescadores, which is the NW extremity of Banco Ortiz, is strewn with dangerous wrecks lying within about 7 miles from the Uruguayan coast between Punta Artilleros and Rada de Colonia.

Punta Negra is 3 miles WSW of Punta Riachuelo and is rocky. A rocky shoal, with a depth of 0.9m, lies 0.25 mile WSW of the point.

Paso Norte

5.26 Paso Norte is parallel with the N shore of Rio de La Plata, between it and Banco Ortiz. It is frequented only by coastal vessels and other craft of shallow draft as it has depths of only 3.7m off the mouth of Arroyo Cufre and near Rocas de las Pipas, when the river is low.

If proceeding from Montevideo through Paso Norte, after passing **Bajio La Panela** (34˚55'S., 56˚27'W.) and Banco de Santa Lucia lighted buoy, steer NW and keep 5 miles offshore, so as to pass S of San Gregorio lighted buoy.

Then alter course to pass about 1 mile SW of Banco Arazati lighted buoy, 1.5 miles S of Punta Pavon, when the depths will decrease gradually to 3.7m.

From a position about 2 miles SW of the mouth of Arroyo Cufre, the channel turns W. After passing Banco Cufre lighted buoy, keep near the shore and then steer to pass S of Piedras del Sauce lighted buoy.

From Punta Artilleros lighted buoy, shape course so as to pass S of Rocas de las Pipas and Roca Barriles, giving these rocks a wide berth, when the depth will again be about 3.7m.

5.27 **Punta Santa Rita** (34˚28'S., 57˚51'W.) lies about 0.2 mile N of Punta San Pedro. Between Punta Santa Rita and Punta San Carlos, 2.5 miles NW, the coast forms a bay, the shore of which consists of a sandy beach backed by dunes.

From Punta San Carlos to **Punta Hornos** (34˚26'S., 57˚54'W.), 0.75 miles farther NW, the coast is low and marshy. A pier which serves Pueblo Real de San Carlos projects from the shore 1.75 miles NW of Punta Santa Rita.

It has a depth of 3.7m at its head. There are cliffs, 40 to 50m high, close behind the beach in the SE part of the bay, but they

diverge from it to the NW and are 0.6 mile inland abreast of Punta San Carlos.

Punta Hornos is low and is fringed by a bank of stones, with depths of less than 1.8m, which extends 0.7 mile W from it.

5.28 **Isla Farallon** (34˚29'S., 57˚55'W.), marked by a light, is 3.25 miles WSW of Punta San Pedro. It is 2.7m high, rocky, and wooded, and is surrounded by a reef with depths of less than 1.8m. A group of rocks awash lie 0.4 mile NNE of the islet.

Banco de los Pescadores, with depths of less than 5.5m, and consisting of sand, forms the NW part of Banco Ortiz.

The bank has a least depth of 1.8m, 2.5 miles SE of Punta San Pedro, and a 2.1m shoal lies close within the N edge of the bank 1 mile S of the point.

A lighted buoy, moored 1.5 miles WSW of Punta San Pedro, marks the NW extremity of the bank.

Isla San Gabriel (34˚27'S., 57˚54'W.), low and covered with brushwood, is 1.5 miles W of Punta San Pedro. It is surrounded by rocks and a reef, parts of which are awash and extend 0.3 mile W. A lighted buoy is moored 0.3 mile S of the SW extremity of the islet.

Bajo Garnet, a rock with a depth of 4.4m, is 0.5 mile S of the extremity of Isla San Gabriel. It is marked on its W side by a lighted buoy.

Bajo Ruby, with a depth of 3.5m, is 0.25 mile S of the NE extremity of Isla San Gabriel.

Bajo La Laja, the E end of which dries, is about 0.6 mile W of Punta San Pedro. It is marked on its SE side and on its N side by lighted buoys.

Roca Anita, with a depth of 0.6m, is 0.5 mile W of Punta San Pedro and a buoy is moored 183m N of this rock.

Barra de Colonia, between the NW extremity of Banco de los Pescadores and Isla San Gabriel, is composed of hard sand and rock with soft mud on either side of it. When the drying portion of Bajo La Laje is just visible there are depths of 4.9m over this bar.

Canal San Gabriel, the channel which passes S of Isla San Gabriel, is the usual approach to Puerto de Colonia from SW. Lighted buoys, mentioned above, mark the sides of the channel.

5.29 Islas de Hornos, extending 1.5 miles WNW from **Punta de Hornos** (34˚26'S., 57˚54'W.), are three low and partly wooded islets. Isla Hornos del Oeste and Isla Hornos del Medio, the two W islets, which lie on a bank with depths of less than 1.8m, are separated from Isla Hornos del Este, which lies on the coastal bank, by Canal de los Bergantines which is navigable by vessels of shallow draft with local knowledge.

Canal de las Zumacas, the channel between Punta Hornos and the E islet, and the channel between the middle and W islets, can only be used by small craft.

Piedra Chata, a rocky shoal with a depth of 1.5m, lies 0.8 mile WSW of Punta Hornos.

Islas Lopez are two bare and rocky islets 1.25 miles N of Isla San Gabriel. Isla Lopez del Oeste, 3m high, lies 0.5 mile W of Isla Lopez del Este which is 2.4m high.

Numerous dangers surround these islets and extend up to 1.25 miles SE from them. Canal Lopez, a channel with a minimum depth of 3.7m in the fairway, passes between these islets.

Piedra Cerdena, with a depth of 1.2m, is almost 0.85 mile WNW of Isla Lopez Oeste. Bajo Relampago, with a depth of 1.2m, is 0.6 mile W of the same islet.

Arrecife Los Muleques, some of which are awash, are 0.5 mile ESE of Isla Lopez del Este. A buoy is moored off the SE end of these reefs.

Colonia (34˚28'S., 57˚51'W.)

World Port Index No. 13140

5.30 Rada de Colonia is W of the promontory on which the Ciudad de Colonia stands. The depths in the approaches are variable, but vessels drawing less than 4.6m can usually enter.

Ciudad de Colonia is a seaside resort and the capital of the local province. It has two harbors. Puerto Franco, on the S promontory on which the town stands, is the most important and is the terminus of the ferries which run to Buenos Aires.

Puerto Commercial, the old harbor, close to Punta Santa Rita the NW extremity of the promontory, is little used except for yachts and other small craft. There is a lifesaving station at Puerto de Colonia.

Winds—Weather.—Rada Colonia is well protected from all winds except those from between SE and SW. Storms from a S point are the most dangerous and cause a current to set at a rate of 3 to 4 knots in the same direction as the wind.

Depths—Limitations.—Puerto Franco de Colonia, the main harbor of Puerto de Colonia, 0.5 mile E of Punta San Pedro, is formed by two jetties projecting S from the shore and is protected from the S by a breakwater composed of rubble. A buoy is moored about 0.1 mile NW of the W end of the breakwater. Below-water rocks lie between this buoy and the breakwater.

Muelle Transatlantico, the E of the two piers which form the harbor, has a total length of 135m. Vessels can berth on both sides of the outer section, 77m long, which has depths of 5m alongside. The inner section, 58m long with depths of less than 5m alongside, can only be used on its W side and is the terminal for the ferries which run to Buenos Aires.

Muelle de Cabotage, which forms the W side of the harbor, is 110m long with depths of about 4m alongside and can only be used on its E side.

There are ro-ro berths at the roots of both jetties. Between them is a quay with a depth of 3m alongside.

Puerto Commercial de Colonia, the old port of Puerto de Colonia, lies on the N side of the promontory on which the town stands. It is protected from the W by Escollera de Santa Rita, a breakwater projecting N from Punta Santa Rita, on the head of which is a light.

A wooden jetty projects N from the shore nearly 183m E of the breakwater, off the head of which there are depths of 2.4m.

It is equipped with a 5-ton steam crane. Construction was in progress immediately N of the breakwater head.

Aspect.—Colonia Light is shown from **Punta San Pedro** (34˚29'S., 57˚51'W.). A radio tower, 84m high and marked by red lights, is about 0.3 mile ENE of the light.

A conspicuous chimney, painted in red and white bands, 39m high, stands about 0.9 mile ENE of the light. A water

tower, prominent from all directions, stands about 0.8 mile NE of the light, and three radio towers stand near Real de San Carlos, 2 miles N of the light. A radio mast, 190m high and marked by red lights, is 6 miles N of the light.

Pilotage.—Pilotage is compulsory in the Rio de la Plata estuary except for coasting vessels.

Vessels entering the estuary may proceed as far as Rada de Montevideo or Practicos Recalada without a pilot. Vessels proceeding farther must obtain a pilot from this lighted vessel, to which they are required to give 48 hours notice of ETA.

Vessels must use pilots of the nationality of their port of destination and when leaving must use pilots of the nationality of the port they are departing.

Anchorage.—The best anchorage in Rada de Colinia is about 0.5 mile WNW of **Punta San Pedro** (34˚29'S., 57˚51'W.) in a depth of 7.3m, stiff mud, with good holding ground.

It is on the alignments of Farallon light tower, with the S extremity of Isla San Gabriel bearing about 250˚, and the W extremity of Isla Lopez del Este in line with the E extremity of Isla Hornos del Medio, bearing about 319˚.

If necessary, ships should moor with open hawse SW. Vessels of shallow draft can anchor nearer Ciudad de Colonia.

Coasting vessels often anchor NW of Isla San Gabriel in bad weather.

Fondeadero de Lopez is about 0.2 mile N of Isla Lopez del Este. It affords good shelter to small vessels during strong S winds in depths of about 5.5m, mud.

Fondeadero de las Islas de Hornos affords good shelter during winds from between SE and SW.

Winds from a W direction are the strongest at this anchorage, but do not raise such a heavy sea as those from the SE and are therefore not so dangerous.

Vessels can anchor about 0.3 mile N of Isla Hornos del Medio and Isla Hornos del Oeste in depths of from 3.4 to 5.5m, mud.

Directions.—When approaching Puerto de Colonia from SW, follow the dredged channel through Barra del Farallon and do not leave it until Colonia light tower bears 068˚.

Then alter course to maintain this bearing which leads over the bank joining Isla Farallon to Banco Ortiz in a least depth of 4m, and passes 0.25 mile S of the reef extending from this islet and about 0.1 mile N of a stranded wreck marked by a lighted buoy.

When clear of this bank steer towards Isla San Gabriel, then alter course to the E to pass between Nos. 1 and 2 lighted buoys, and approach the port through Canal San Gabriel.

Give **Punta San Pedro** (34˚29'S., 57˚51'W.) a wide berth, particularly during the S-going tidal stream, which sets towards the point at rates of from 1 to 2.5 knots.

If approaching Colonia from the E by way of Paso Norte, having passed Roca Barriles, follow the land which can be closed to within 0.5 mile to Rada de Colonia, passing S of the breakwater at Puerto Franco de Colonia. Punta San Pedro should be rounded at a distance of at least 0.25 mile, bearing in mind that the tidal streams are stated to set onto this point.

To proceed from Colonia by the channels to the N, steer to pass midway between Islas Lopez. When about 0.4 mile NE of Isla Lopez del Oeste, shape course for the W extremity of Isla Hornos del Oeste, passing at least 183m SW of Piedra Chata.

Then alter course so as to enter the S end of Barra de San Pedro. The least depth on this route is 2.7m near Piedra Chata.

Caution.—Submarine cables, indicated on the chart, extend S and E from Punta San Pedro.

Cabo San Antonio to Buenos Aires

5.31 The S shore of Rio de la Plata is low and uniform, being the seaward edge of the Pampas of Provincia de Buenos Aires immense and monotonous plains which extend to the Seirras Centrales, 420 miles W. Owing to the lack of landmarks, and also to the banks by which this shore is fringed, navigation near it is difficult.

Banco Rouen lies with its shallowest part in the vicinity of 35˚45'S, 56˚01'W, and 39 miles NE of Cabo San Antonio, the SW entrance point of Rio de la Plata.

This shoal has a least depth of 7.6m near its NW end. It is composed mainly of coarse sand, but there are some rocks on its shallowest part.

Off-lying shoals, with depths of 17.8 and 40m, are 68 and 105 miles ESE, respectively, of Cabo Antonio.

Cabo San Antonio (36˚20'S., 56˚45'W.) is the N and lower end of Medanos del Chato, a chain of sandhills visible up to about 10 miles offshore which back the coast to the S.

The part of the chain near the cape is known as Fronton del Cabo.

The NW extremity of the cape is **Punta Rasa** (36˚18'S., 56˚47'W.), a low and sandy tongue of land which is subject to inundation as far as the walled area surrounding the light structure and adjacent buildings, which with a neighboring plantation of trees are very prominent from seaward. A beacon has been established at the edge of Punta Rasa.

Cabo San Antonio Light

There is an anchorage for small vessels in this area. The outer berth is 0.6 mile N of Punta Rasa, chalky bottom, in 4.5m, and the inner berth is 0.4 mile W of the point, in 2m, soft mud.

Several charted banks, on which the sea breaks and with depths of less than 1.8m, are N of Punta Rasa.

Vessels should approach San Antonio Light on a course of 201˚ until it is distant 2 miles; a course of 250˚ then leads to the outer anchorage.

Tidal currents off Cabo San Antonio are affected by the wind. In calm weather the tides are regular, but during fresh winds from between E and S, the water level rises 1m or more

above mean HW springs. During winds from W and NE the tide does not rise to its usual level.

In the outer anchorage of Fondeadero San Clemente, the general directions of the flood and ebb tidal currents are NW and SE, respectively. Both normally attain a rate of 1.5 knots, but may attain 4 knots during gales.

Currents off Cabo San Antonio depend greatly on the wind, running N or S at rates of 1 to 3 knots.

Rates of 5 or 6 knots have been reported being caused by abnormal floods in the rivers.

Bahia Samborombon is entered between Punta Rasa and Punta Piedras, 54 miles NNW.

5.32 Bahia San Clemente (36˚18'S., 56˚47'W.) is formed by the W side of Cabo San Antonio. Arroyo San Clemente flows into the head of this small bay 1.75 miles S of Punta Rasa.

The entrance to the river is used quite often as a fishing harbor.

From the mouth of Arroyo San Clemente to the mouth of Rio de Ajo, 6 miles W, the coast increases in height gradually.

The bar of Rio Ajo is about 2 miles in extent and almost dries, but there are depths of more than 3.7m within it.

Pueblo General Lavalle stands on the E bank of the river 4.5 miles SSW of its mouth.

Rio de Ajo is reported to be marked by a light off its entrance.

Between the mouth of Rio Ajo and the entrance to Canal 1, 10 miles WNW, the coast is devoid of vegetation but some distance inland there are ranches with clumps of trees which appear as islands when seen from 8 or 9 miles offshore.

Between the entrance to Canal 1 and that of Canal 9, 12.5 miles NW, the shore is low and devoid of vegetation, but there are some fishermen's huts on it.

From the entrance to Canal 9, the shore of the bay trends NNW for 11 miles to the entrance to Canal 15.

The clumps of trees at Estancias Las Viboras, Santa Maura, and La Portena, 8 miles SW and 9 and 11 miles NW, respectively, of the former entrance are good landmarks.

From the entrance to Canal 15 to the mouth of **Rio Salado** (35˚45'S., 57˚21'W.), 13.5 miles W, the coast rises gradually with several prominent clumps of trees.

A group of sheds and buildings, forming a good landmark, are on the S bank of Rio Salado, the entrance of which is marked by a light.

A dangerous wreck is reported to lie 17 miles SSE of Rio Salado.

Rio Samborombon, with a drying bar at its mouth, can be identified by a white house on the S bank and a group of willow trees on the N banks.

Clumps of trees are 3 miles NW and 6 miles N, respectively, of the mouth of Rio Samborombon. They are both good landmarks, the latter being the most prominent mark in the bay.

Monte San Jeronimo, 7 miles SW of **Punta Piedras** (35˚27'S., 57˚08'W.), can be seen at a distance of 7 or 8 miles.

A windmill and a tank form a good mark. Towards Punta Piedras the coast increases in height.

Tides—Currents.—Almost anywhere within about 4 miles of the coast the tidal current follow the general direction of the shore of Bahia Samborombon at rates of 0.25 to 1.5 knots.

Winds between W and N increase the duration of the S current and reduce the height of the tide. Winds between SE and SW increase the duration of the N current and increase the height of the tide. The configuration of the shore and the banks off it cause variations in the rate and direction of the tidal current, even in places quite close to each other.

Anchorage.—The best anchorage in Bahia Samborombon is about 5 miles offshore between the entrances to Canal 9 and Rio Salado, in a depth of 5.5m, firm clay and sand, very good holding ground.

The swell here is not dangerous even during SE winds, but in storms from this direction there is a better berth about 8 miles offshore E of the entrance to Canal 9 in a depth of 6m.

Small craft can anchor close inshore anywhere between Cabo San Antonio and Monte San Jeronimo, as the swell is almost spent here even during E winds.

The bottom is mud nearly everywhere in the bay; it is softer close inshore than farther seaward, and is almost liquid in some places.

In a few areas, the bottom is composed of sand or of sand with shells and mud; off Monte San Jeronimo, there is rock in depths of less 3.6m.

A dangerous wreck reported to lie about 14 miles NE of the entrance to Canal 9.

5.33 Punta Piedras (35˚26'S., 57˚07'W.) is low and indeterminate. It is composed of tufa, a species of compact and friable sandstone, looking like hardened clay. This material, locally known as "tosca," is found in various places on the coastal bank between this point and Puerto de Buenos Aires, 80 miles NW. A light is shown 0.7 mile W of the point.

Banco Piedras, with depths of less than 5.5m, extends 20 miles ENE from Punta Piedras. It is composed of tufa, gravel, and coarse sand.

Punta Indio (35˚16'S., 57˚14'W.), also low and indeterminate, lies 13 miles NNW of Punta Piedras. It can be identified by Monte Casares, a large clump of trees 1.5 mile S.

This clump is visible at a distance of about 15 miles, at which distance it resembles an island.

Close NW of Monte Casares is a smaller group of trees, in which stand the buildings of Estancia Santa Rita. A white house with a red roof can be identified easily at 15 miles. A naval air station is situated inland from the point.

From Punta Indio to Punta Atalaya, 20 miles NW, the coast is at first a uniform height and covered with scrub, but near the town of Magdalena, 3.5 miles S of the latter point, the ground rises slightly.

The mouth of Arroyo Juan Blanco, which affords shelter to coastal craft, lies 12.5 miles NW of Punta Indio. Monte de la Primevera, a dense clump of trees about 1 mile in extent, lies 2 miles W of the mouth of Arroyo Juan Blanco. It surrounds a ranch of the same name, with a red tower at its E end, which is a good landmark.

5.34 Magdalena (35˚05'S., 57˚31'W.) is a town which can be seen above the scattered trees in its vicinity. The two towers of the church are visible at a great distance, but are obscured by the trees on certain bearings.

Punta Atalaya (35˚02'S., 57˚32'W.), marked by a light, is low and covered by trees. A red brick building, with a

prominent chimney visible at a distance of 10 miles, is situated near the point.

Arroyo Atalaya, 0.5 mile W of the point, can be entered by small craft drawing up to 1.5m.

From Punta Atalya to Punta Blanca, steep and covered with trees, situated 8.5 miles WNW, the coast is fringed by a bank of very hard tufa out to a depth of 3.7m. A sandy shoal, with a depth of 1.8m, lies on the coastal bank 2.5 miles N of the latter point.

A prominent factory stands on the coast 8.75 miles WNW of Punta Blanca. The entrance to Puerto La Plata lies 3.25 miles farther WNW.

Caution.—Visual estimation of the distance of a vessel off this coast may be considerably in error, due to the effects or mirage and abnormal refraction, which cause objects near the horizon to have a false elevation.

Submarine cables, which are charted, are laid from Punta Atalaya to the N shore of Rio de la Plata, about 1 mile W of Bahia de Montevideo.

Other submarine cables, also indicated on the area chart, are laid from a position on the coast about 4 miles SE of the mouth of **Canal Santiago** (34˚50'S., 57˚53'W.), in an E direction parallel to the coast.

Off-lying Banks

5.35 Banco Ortiz, which covers a large area with depths of less than 5.5m, extends 50 miles SE from the N shore of Rio de La Plata between **Punta Pavon** (34˚32'S., 57˚03'W.) and Punta San Pedro, 40 miles WNW.

The S extremity is joined to Banco Piedras forming the bar of Rio de la Plata, over which passes the main approach to the ports of La Plata and Buenos Aires.

El Cadillo (35˚08'S., 56˚59'W.), with a least depth of 4.9m, lies at the SE end of Banco Ortiz, about 20 miles N of Punta Piedras. It is composed of sand and mud, with patches of hard sand in places.

Canal General, which comprises Canal Punta Indio and Canal Intermedio and is described in paragraph 5.36, is dredged through this bar.

A chain of shoals, with depths of less than 3m, lie along the SW edge of Banco Ortiz, and a similar shoal of considerable extent, lies 10 miles WSW of Punta Pavon. Banco de los Pescadores forms the NW extremity of the bank.

Quebrada del Banco Ortiz is a channel across the S end of Banco Ortiz, through which a depth of 4.5m can be carried.

The E and W ends of the channel are marked as are a wreck and obstruction. This channel is used by the ferries which run between Buenos Aires and Montevideo.

Banco Magdalena, with depths of less than 5.5m, lies 7 miles NE of Punta Atalaya and is joined to the coastal bank in that vicinity. It has a least depth of 11.8m and is marked on its SW side by a lighted buoy.

Canal de la Magdalena, a channel used by coasting vessels, passes SW of Banco de la Magdalena. The tidal streams in it are somewhat stronger than in the main channel and can be used by vessels with a draft of less than 4.9m.

Banco Chico, with depths of less than 5.5m, lies N of Banco Magdalena and extends NW from it. It has a least depth of 3m near its middle. Two wrecks, with masts showing, lie on the bank.

Canal General

5.36 Canal General is the channel forming the main approach to the ports of La Plata and Buenos Aires.

The first section of the channel leads from **Practicos Recalada Light Vessel** (35˚10'S., 56˚15'W.) for about 35 miles to a bend called Vuelta El Codillo, then NW for about 12 miles and is called Canal Punta Indio.

At this point, 35˚01'S, 57˚11'W, the second section of the channel, Canal Intermedio, begins and continues to Km 78 **Lighted Buoy** (34˚49'S., 57˚26'W.), which is 12.5 miles NNE of Punta Atalaya and abreast the middle of Banco Chico.

Beyond the point, the channel merges into Paso Banco Chico, a natural channel passing N of the NW end of Banco Chico and then into the area of comparatively deep water which lies off the entrances to the dredged channels leading to the ports of La Plata and Buenos Aires.

Canal General is only maintained by continual dredging and the depths in it are considerably affected by meteorological conditions; no depth is therefore guaranteed in the channel, but the responsible authority endeavors to maintain a minimum depth of 8.2m at normal MLLW.

In 1993, the depths in Canal Punta Indio were maintained at approximately 9.1m. The latest information regarding depth in the channel is published fortnightly in Argentine Notices to Mariners, and is also broadcast from Argentine Radio stations.

Pilotage is compulsory as discussed previously in paragraph 5.2.

Canal General is marked in accordance with the Argentine system by lighted buoys. For the first 25 miles from **Practicos Recalada Lighted Float** (35˚10'S., 56˚17'W.) they are moored in pairs, alternately with single lighted buoys moored on the S side of the channel, spaced from 1 to 2.5 miles apart; then for the remainder of Canal Indio, they are placed in pairs only.

The lighted buoys are numbered consecutively starting with pair No. 1, moored about 4 miles W of the lighted vessel, and ending with pair No. 30 at the inner end of the channel.

Canal Intermedio and Paso Banco Chico are marked by single lighted buoys, the first three of which are numbered 31, 32, and 33; thereafter, they are marked with their distance from the entrance to Darsena Norte at Buenos Aires in kilometers, starting at Km 99, which shows a racon, and ending at Km 57. There is a pair of lighted buoys at Km 60.

There are numerous uncharted lighted buoys, painted white, in the vicinity of Canal General which are used for dredging purposes.

Tides—Currents.—Some of the lighted buoys marking Canal General are fitted with rudders which cause them to swing to the tidal current and have white arrows painted on their sides which indicate the direction in which it is going.

They are also fitted with auxiliary lights that reported on their sides. When facing the buoy from its downstream side, a red light is shown on the left side of the buoy and a white light on the right side. These lights each show over a sector of 60˚ and are separated by two sectors of 120˚ in which these are obscured.

There is a tide gauge close E of No. 32 lighted buoy, 14 miles ENE of Punta Atalaya. Tide gauges are also located at Km 99 and Km 180 in Canal Punta Indio.

Regulations.—The following are extracts from special regulations applying to Canal Punta Indio and the "Privilege Zone," which covers Canal Intermedio and Paso Banco Chico, from Practicos Recalada Lighted Float to Km 57 Lighted Buoy, off Rada de la Plata.

The Privilege Zone includes that part of Canal General of Rio de la Plata which extends about 0.2 mile on either side of the lighted buoys Nos. 31 and 33 and those at Km 99 to 57, all of which are to be considered to be in mid-channel, except the pair at Km 60. Vessels navigating in this zone have the same privileges as those navigating in Canal Punta Indio.

Canal Punta Indio includes that part of the main channel of Rio de la Plata between Practicos Recalada Lighted Float and No. 30 pair of lighted buoys, and extending about 0.1 mile outside each line of lighted buoys.

Vessels drawing more than 7.3m and outbound, should enter the Privilege Zone at Km 57 Lighted Buoy, and if her draft permits, should pass S of the line of lighted buoys marking the mid-channel far as No. 30 pair of lighted buoys marking the inner end of Canal Punta Indio. Similar vessels inbound, having left No. 30 pair of lighted buoys, if their draft permits, should pass N of the line of lighted buoys.

Vessels drawing more than 7.3m, navigating in Rio de la Plata, must proceed through the whole of Canal Punta Indio and the Privilege Zone, except in special circumstances.

Vessels, with drafts of 6.4 to 7.3m, must similarly follow the main channel through Canal Punta Indio and the Privilege Zone, according to the depth of the river.

Vessels drawing 5.8m and up, but less than 6.4m must follow the main channel and the Privilege Zone, but they may only use Canal Punta Indio itself between Nos. 19 and 23 pairs of lighted buoys when the depth of the river makes it advisable.

Vessels drawing less than 5.8m, navigating in Rio de la Plata, should proceed through the Privilege Zone. They are prohibited from passing through Canal Punta Indio.

Two vessels, proceeding in opposite directions in the channel, should alter course to starboard in plenty of time.

Vessels proceeding in the same direction are forbidden from overtaking unless the difference in their speeds is at least 3 knots; the overtaking vessel will sound one long blast.

The vessel to be overtaken will acknowledge this signal by sounding the same signal if she is about to alter course to starboard, or by two short blasts if she is about to alter course to port. This maneuver will be executed when the vessel to be overtaken complies with the request of the other vessel.

The vessel to be overtaken will reduce speed as much as possible in order to lessen the time taken in passing.

Overtaking is prohibited between lighted buoys No. 15 and 23.

Should two vessels, proceeding in opposite directions, be likely to meet abreast the pair of **Lighted Buoys No. 21** (35˚10'S., 57˚00'W.), the outbound vessel will reduce speed in order to allow the inbound vessel to pass these lighted buoys first.

Two vessels, proceeding in opposite directions, shall, when at a distance of not less than 1 mile from one another, alter course to starboard.

The vessel having the current on her starboard bow shall pass close along the line of lighted buoys on her side in order to allow the other vessel plenty of room.

Should one of the vessels not be completely under control, she should display the appropriate signal and the other vessel should maneuver so as to facilitate her passage.

Sailing vessels, whatever their draft, can only use the channel by day and when in tow. If a sailing vessel navigating in the vicinity of the channel should have to cross it, whether to work to windward or for any other reason, she should do so without interfering with vessels navigating in the channel.

Tugs which have one or more small vessels in tow may not use the channel.

Any vessels or dredge navigating in the channel shall have right of way over any other vessel which is outside the channel or about to enter it.

Anchorage is prohibited within the channel and Privilege Zone. Any vessel anchored in the vicinity of Canal Punta Indio or the Privilege Zone must display, by day, a black ball 0.6m in diameter visible from all directions and in a position corresponding to that of a vessel's riding light when at anchor.

This signal is also obligatory for all vessels anchored in Rada Exterior del Puerto de Buenos Aires.

A vessel aground may not work her engines when another vessel is passing her.

With the purpose of avoiding accidents, any vessels navigating in the channel or the Privilege Zone and obliged to heave-to on account of fog, squalls, etc., should immediately broadcast by radio an urgent signal giving name and position.

Vessels entering the channel from seaward should pass N of the lighted vessel, and those leaving should pass S of her.

In case of bad weather, a vessel embarking or disembarking a pilot should take up the most convenient position in order to reduce the risk of transportation.

Any vessel approaching a dredge working in the channel should proceed without altering course or speed provided that she allows the dredge sufficient time to leave the channel. No ballast, clinkers, nor generally speaking, any article that will not float, may be thrown overboard when in the channel.

These regulations should be strictly complied with, except in special circumstances, such as fog, risk of collision, fire, damage to machinery, sailing vessel in the channel, etc., when a vessel should comply with the Regulations for Preventing Collisions at sea.

Signals.—Suction dredges display flag "W" of the International Code of Signals in a conspicuous position between their masts.

Caution.—The pairs of lighted buoys described above mark the limits of the dredged channel in Canal General, but the mariner should bear in mind that its cross section is usually V-shaped and that its maximum depth does not extend for its full and entire width.

Between Nos. 1 and 20 pairs of lighted buoys, the deepest water lies S of the center line of the channel. Vessels with circulating water intakes set low in the hull, if drawing more than 7m, should have regard to the possibility of their intakes becoming choked with mud.

Navigation between Buoys 15 and 23 is hazardous because of the tendency to ground on the edge of the channel. Years ago, a ship drawing 10m grounded in this part of the channel.

Puerto de La Plata (34˚54'S., 57˚56'W.)

World Port Index No. 13770

5.37 La Plata comprises Puerto de la Plata, Ciudad de la Plata, a provincial capital 4 miles SW of the port, and the towns of Berisso and Ensenada, close E and W, respectively, of the port.

The port consists of a roadstead, an entrance protected by moles, narrow finger-like harbor areas formed by the Rio Santiago and several canals, and a turning basin.

Anchoring and berthing accommodations are available for deep-draft vessels. The port may be temporarily closed during the spring and fall seasons due to gale force winds.

The main local industry is the preparation and export of frozen meat. The port is also the site of a large oil refinery, a steel mill, and the main base and training establishment of the Argentine Navy.

Tides—Currents.—The mean HW interval at the port is 3 hours 52m. Spring tides rise 1.2m and neaps rise 1.1m.

The time of HW is regular, but the height of the mean level of HW is so affected by the winds that the vertical movement of the tide is sometimes almost negligible. SW winds cause the level of water to rise and NW winds lower it.

In extreme cases, such winds raise or lower the level as much as 2.4m above or below the chart datum.

The mean level of the estuary is highest in December and January, and lowest in June and July, the difference being about 0.3m.

The mean monthly tidal range is about 1m in December and January when it is greatest, and 0.7m in June and July when it is least.

Depths—Limitations.—Regulations limit length, beam, and draft to 215m, 30m, and 7.6m, respectively.

Access to the port is by a channel which leaves the main entrance channel to Buenos Aires 30 miles NW. This channel was dredged to a depth of 10m in 1984, but is subject to silting. La Plata Roads extends for 3.5 miles from the moles.

The port is made up of Rio Santiago, Gran Dock, and the Propulsoria Berth, about 2.7 miles up the Rio Santiago, which is also known as Port Ingeniero.

Rio Santiago is on the W side of the entrance to the Gran Dock. The quay is 372m long with a depth of 6.1m alongside.

Four tanks for reception of liquid chemicals have been installed here. The packing plants are operating at less than capacity.

Gran Dock is used only by tankers. It has berths on both sides, each 1,274m and with depths of 7.3 to 8.8m alongside.

A turning basin lies at the head of the dock, however, because it is only about 228m wide, large vessels are unable to use it and are turned outside the entrance channel, entering the dock stern first.

Propulsoria Berth is the site of cold rolling steel mill. A single berth here is 154m long, but has handled vessels up to 202m.

The berth is reached through a channel dredged to a depth of 9m through the W part of Rio Santiago. The pier has a depth of 9m alongside.

Aspect.—Prominent objects in the vicinity of Puerto de La Plata include; the semaphore tower and mast, 38m high near the root of the E mole protecting the approach channel to the port; a tower surrounded by a sphere painted orange and white, 62m high, standing 3.25 miles WSW of the semaphore tower; a hammer-head crane, 45m high, about 1.7 miles SW of the semaphore tower; and the building of the Jockey Club on Punta Lara, 7 miles WNW of the water tower.

Pilotage.—The harbor pilot takes over in Rada de La Plata, and boards about 1 mile off the end of the access channel.

Their services should be requested through the ship's agent before 1700 on the day before the ship's arrival.

The agent is responsible for transporting the pilot to the roadstead. Pilotage is compulsory.

Coming from sea or Montevideo, the Recalada or Uruguayan pilot will take the vessel to La Plata Roads where the La Plata port pilot comes aboard.

Regulations.—Vessels navigating in the entrance channel have precedence over vessels in Rio Santiago.

Vessels longer than 60m, or with a beam wider than 9m or a draft of greater than 6.1m, may not cross or overtake in the entrance channel. Vessels getting underway from Gran Dock will not depart when another vessel is inbound.

On a flood tide, the vessel's draft must not exceed the minimum channel depth. On an ebb tide, the vessel must have an underkeel clearance of at least 0.5m.

Vessels greater than 190m can maneuver in daylight only, with a minimum visibility of 0.8 mile and a wind speed of less than 10 knots.

Vessels over 140m long or with a draft greater than 7.3m may use Rio Santiago in daylight hours only. Vessels with a beam of over 11m may not pass or overtake in Rio Santiago.

Except for the following, the same port regulations as those in force at Buenos Aires apply to Puerto de La Plata.

Towage is compulsory for all ocean-going vessels, and for coasting vessels exceeding 300 grt.

Powered vessels entering the port must employ one tug as far as **Rio Santiago** (34˚51'S., 57˚53'W.) and two tugs, bow and stern, beyond that.

Movements of vessels in the port are effected by means of two tugs, bow and stern. Vessels which can turn in Gran Dock are permitted to do so, with the aid of two tugs, without having to proceed to the turning basin.

Towage is not compulsory for vessels shifting berth for a short distance along a wharf.

Vessels of less than 300 grt are permitted to maneuver in the interior of the port with 1 tug only. Towage is not compulsory for such vessels proceeding to Dique de Cabotaje.

Signals.—Daytime tidal information is transmitted at 5 minutes past each hour on VHF channel 5.

At night, the following signals are shown from the semaphore tower at the root of the E mole:

1. One long white flash denotes that the tide is rising.
2. Two short white flashes denote that the tide is falling.
3. One long red flash is shown for each meter above zero, and each 10cm is indicated by one short red flash.
4. One long green flash is shown for each meter below zero, and each 10cm is indicated by one short green flash.
5. One short red flash followed by one short green flash indicates zero.

The period of each signal is 30 seconds.

Gran Dock—Santia Canal

The following traffic signals are displayed from the signal station:

1. A black square flag at the W yardarm denotes that a vessel has been sighted.
2. A yellow flag at the E yardarm, at the dip, denotes that a vessel is entering; a similar flag at the W yardarm, at the dip, denotes that a vessel is leaving.
3. A red flag at the E yardarm denotes that a vessel requires assistance.
4. A red flag at the W yardarm, at the dip, denotes that the channel is blocked.

The signals with regard to dredges at Puerto La Plata are the same as those at Buenos Aires, which is discussed in paragraph 5.39.

Anchorage.—Anchorage is in Rada de La Plata, an area with depths of 5 to 10m extending up to 5 miles from the heads of the moles protecting the approach channel.

An area, indicated on the chart, in its SE part is reserved for ships of the Argentine Navy. There are berths near the heads of the moles in depths of 8.5 to 9m, very soft mud, but the holding is not good, especially during strong SW winds.

A Lightening Zone and Waiting Area for embarking and disembarking pilots have been established N of the port entrance and are best shown on the area chart.

Directions.—A vessel approaching from the E, having cleared Banco Chico, should steer about 270˚ until the mole heads bear about 210˚, and should then steer for them. It should be borne in mind that the tidal streams always set across the entrance, sometimes attaining a rate of 3.5 knots.

Puerto La Plata to Puerto Buenos Aires

5.38 Ensenada de Barrangan is entered between the mouth of Canal Santiago and **Punta Lara** (34˚47'S., 58˚00'W.), low and indeterminate, situated 6.5 miles WNW. Rio Santiago, the mouth of which has been almost completely blocked by spoil dredged from the channels in Puerto de La Plata, flows into the head of the bay. It is joined by Arroyo Zanjon before it reaches the bay.

The W part of the shore of the bay is backed by a holiday resort which includes the prominent building of the Jockey Club previously mentioned in paragraph 5.37.

From Punta Lara to Puerto de Buenos Aires, 20 miles WNW, the coast is low and covered with pasture and scrub; parts of it are subject to inundation.

Suburbs of Buenos Aires stand near the railway, 1 to 2 miles back from the coast.

Punta Colorado, low and indeterminate, is 5.5 miles WNW of Punta Lara. Punta Quilmes, a similar point, lies 5.5 miles farther WNW.

Quilmes, an important industrial suburb which extends from the railway to the coast, lies close W of Punta Quilmes.

The Communication Service for the Safety of Navigation (SECOSENA) is in effect for the Argentine waters of Rio de la Plata and approaches, bounded on the E by 56˚W and on the S by 36˚30'S, and is mandatory for foreign vessels, 24m long.

When entering the area, vessels must report the name of vessel, flag, call sign, length, breadth, draft, speed, port of

departure, destination, navigational plan, and ETAs at points listed in the CONTRASE system below, as appropriate.

When leaving the area, vessel must report the name, flag, and call sign.

Port of Buenos Aires (34˚36'S., 58˚22'W.)

World Port Index No. 13760

5.39 The Port of Buenos Aires is on the S bank of the Rio de la Plata, about 126 miles NW of Cabo San Antonio and about 168 miles W of Punta del Este. It consists of a roadstead, dredged channels, an elongated artificial harbor, and extensive facilities for ocean-going vessels.

Ciudad de Buenos Aires, capital of the Argentine Republic, is the largest city in the S hemisphere and the seventh largest in the world. In addition to being the political capital of the country, Buenos Aires is its industrial and cultural center.

The city stands on the NE edge of the Pampa, a vast plain which extends up to 300 miles SW, and which, in the vicinity of the city, is only 9 to 12m above sea level.

Tides—Currents.—The time of HW is regular, but the height of the mean level of the water is so affected by the winds that the vertical movement of the tide is sometimes almost negligible.

The flood current runs for 5 hours 20 minutes, and the ebb cur rent runs for 7 hours 5 minutes, at rates of 1 to 2 knots. Winds from the SE cause the level of the water to rise, and those from NW depress it. In extreme cases, such winds raise or lower the level as much as 2.4m above or below chart datum.

The mean level of the estuary is highest in December and January, and lowest in June and July, the difference about 0.3m.

The mean monthly tidal range is about 0.9m in December and January, when it is greatest, and 0.8m in June and July, when it is least.

The tidal currents set across both Canal Norte and Canal Sur, meeting the former at an angle of 50˚, and the latter at an angle of 70˚. They run strongly across the inner end of Canal Norte, but may hardly be felt farther seaward.

It should be noted that the flood current continues to flow after HW, and the ebb current after LW.

The only reliable guides to the direction of the current are the current indicating buoys.

Depths—Limitations.—The access channel to the port of Buenos Aires is entered between a pair of buoys at Km 37 in 34˚41'S, 57˚58'W, about 20 miles ESE of the port.

A dangerous wreck, marked close S by a lighted buoy, and an obstruction lie, respectively, on the N and S sides of the channel about 0.6 mile WNW.

These hazards reduced the navigable width of the channel to 100m. Overtaking in this section of the channel is prohibited.

This channel leads in a WNW direction for 13.5 miles where at Km 12, Canal Emilio Mitre (described in paragraph 5.55) branches to the NW. At Km 8.2, the channel divides again. Canal Norte, the N fork, leads in a WNW direction for 5 miles to Puerto Nuevo, the N part of Buenos Aires.

Canal Sul, the S fork, leads in a WSW direction to the S entrance of the port.

Efforts are made to keep Canal de Accesso, Canal Norte, and Canal Sur dredged to depths of 9.1m, 7.1m, and 7.6m, respectively. These depths are not constant because of silting, and they depend on constant dredging.

The actual depth depends on channel condition, stage of tide, and weather conditions. Latest information about depths is promulgated in the Argentine Notice To Mariners.

When large passenger liners, LASH, or Liquefied Gas carriers are entering or leaving, it is possible that the access channel will be closed for a period of four hours because of the narrowness of the dredged channel.

Vessels, with a draft up to 9.7m, have used the main channel safely.

The harbor consists of many basins and docks. They are described from S to N, starting with the W end of Canal Sur.

Darsena Propaneros lies on the S side of Canal Sur and consists of a 356m long central pier with dolphins. It is used by liquefied gas carriers and has a depth alongside both sides of 10m. Only two vessels can use this facility at the same time.

An overhead power cable, with a vertical clearance of 92m, crosses the dredged channel close E of Darsena Propaneros.

Darsena de Inflamables lies close within the S entrance to the port and consists of 7 piers for the exclusive use of tankers.

The entrance is 50m wide. There is a depth of 7.6m inside the basin. Tankers discharge at the piers on the W side of the basin.

Darsena del Este lies on the N side of Canal Sur and is used for harbor service craft. It is divided into two basins. Basin No. 1, the W most, has depth of 7.3m at its center, but only 4.9m at its entrance. Basin No. 2 has a depth of 7.3m at its center, but only 4.3m at its entrance.

Extending E from Basin No. 2 is a 260m long mole used by tankers discharging fuel for the power plant located adjacent to this mole.

South Outer Harbor lies at the W end of Canal Sur and gives access to Dock Sud, Puerto Riachuelo, and Darsena Sud.

Dock Sud consists of two sections divided by a turning basin. It is reported to be dredged to 8.2m, but is subject to silting. The N section, which is 90m wide, has a quay, 1,109m long on its E side while the W side has a 911m long quay with a depth of only 3.6m alongside.

The S section, 90m wide, has a 1,000m long quay used for discharging sand located on its W side, and 8 jetties used for discharging petroleum products located on its E side.

When loading and the vessel draft reaches 7.1m, the vessel must shift to Porto Nuevo.

Puerto Riachuelo is located on the river which extends SW from the South Outer Harbor. The mid-channel depth is about 6.2m. There is a total of almost 4 miles of berthing space, with depths of 5.2 to 5.8m, used mainly by coasting vessels.

A vertical lift bridge, with a horizontal clearance of 20.6m in the closed position and 42.6m in the open position, lies close to the mouth of the river.

Darsena Sud extends NW from the South Outer Harbor and is used by various vessels, including passenger ferries, ro-ro vessels, and tankers.

The harbor authority tries to maintain a depth of 7.3m, but the area is subject to silting and depths of less than 4.3m have been reported.

The basin is 1,029m long with a minimum width of about 100m.

Puerto Madero extends N for about 3 miles from Darsena Sud and consists of four docks connected by locks.

Dique No. 1, the S basin, is connected to Darsena Sud by a lock 184m long, 20m wide, with a minimum depth of 5.8m.

The basin itself, used mostly by river craft, is 570m long, 160m wide, and 5.1m deep.

Dique No. 2, used for container cargo, is connected to Dique No. 1 by a lock 80m long, 20m wide, and 5.5m deep.

The basin itself is about 570m long, 160m wide, and 5.5m deep.

Dique No. 3, used for grain and general cargo, is 690m long, 16m wide, and 5.8m deep. It is connected to Dique No. 2 by a lock, 80m long and 20m wide.

Dique No. 4, the N basin, used for general cargo, is 630m long, 160m wide, and 6.4m deep. It is connected to Dique No. 3 by a lock, 74m long and 20m wide. It is also connected to the N with Darsena Norte by a lock, 197m long and 25m wide.

Darsena Norte lies N of Puerto Madero. There are two wharfs within the basin, one 210m long and the other 221m long. The W side of the basin is 390m long, the S side is 352m long, and the N side is 326m long. There are depths of 6.4m alongside the wharfs. The basin is entered through a 100m wide passage.

Swing bridges are located across all the locks. During the week they are opened on request from 0600 to 2000. On Saturdays, Sundays, and holidays, they can be opened by a request through the vessel's agent.

Puerto Nuevo is entered at its S end from Canal Norte via the North Outer Harbor. It consists of five basins used by ocean-going vessels and is reported to have been dredged to a depth of 10m, but is subject to silting. A sixth basin lies NW of Puerto Nuevo and is entered from N.

This basin is inaccessible to ocean-going ships and is used only by local river craft. Depths in the basins are subject to variation and are published in local bulletins.

Jetty No. 1, which is 100m long, separates Darsena A from the North Outer Harbor and is used mainly by river craft.

Darsena A, which is 365m long and 140m wide, has 869m of berthing space. The N side can accommodate 2 medium-sized vessels. The W side is reserved for use by the Argentine navy. At the passenger terminal on the SW side of the basin, there is room for one vessel.

Jetty No. 2, which is 202m long, separates Darsena A from Darsena B and is used by large passenger vessels.

Darsena B, which is 464m on its S side and 525m on its N side, is 151m wide and has 1,165m of berthing space. The basin can accommodate 7 vessels.

Jetty No. 3, which separates Darsena C from Darsena B, has a total length of 286m.

Darsena C, which is 495m long on its N side and 585m long on its S side, is about 175m wide, with a total berthing length of 1,284m. Grain is handled at the S side of the basin. The basin can accommodate seven vessels.

Jetty No. 4, which separates Darsena D from Darsena C, is 295m long and can load 2 grain vessels simultaneously.

Darsena D, which is 495m long on its N side and 585m long on its S side, is 194m wide. The basin has a total berthing length of 1,300m. Grain is reportedly handled on the S side of the basin. Containers are handled on the N side of the basin.

Jetty No. 5, which separates Darsena E from Darsena D, is 523m long, of which 240m is for unloading coal for the power plant located here.

Darsena E has the same dimensions as Darsena D and is used to handle coal and oil for the power plant.

Jetty No. 6, used for the unloading of coal, is 310m long and can only accommodate one vessel.

Darsena F, which faces N, is very shallow and is only used by barges unloading sand.

Pilotage.—Pilotage is compulsory for all vessels over 1,000 grt. A vessel requiring a pilot should display flag "P" of the International Code of Signals at the foremasthead until a pilot arrives on board. Pilots are picked up at Puerto de la Plata.

Regulations.—The following extracts from the General Regulations for Puerto de Buenos Aires apply to the roadstead and approach channels:

Any vessel may enter the port, by day or at night, provided she complies with the regulations.

Anchorage is prohibited in the channels or within about 0.1 mile of their sides.

During thick fog, entry and departure is prohibited without special permission from the port authorities.

Vessels, proceeding in opposite directions, meeting in channels should alter course to starboard in plenty of time, and should reduce speed while passing each other.

Vessels overtaking others are not allowed to pass them and must keep at a distance of 183m from coasters, and of about 0.5 mile from other vessels.

Anchorage is prohibited in the channels or within about 0.1 mile of their sides.

No vessel is allowed to enter the channels unless the tidal information gives a depth equal to the vessel's draft on a rising tide, or 0.5m more than her draft on a falling tide.

A vessel drawing more than 6.7m must have a tug ahead between Km 8 and the entrance to the port in each channel, and also one astern between Km 4 and the entrances.

A vessel drawing less than 6.7m must have a tug ahead between Km 5 and the entrances, and also one astern between Km 1 and the entrances, in each channel.

Between Km 15 and the port, the maximum speed allowed is 8 knots; within the port it is 3 knots. Speed should be reduced as much as possible when passing dredges working in the channels.

Before shifting berth within the port, a vessel must obtain permission from the port authorities, and such movements will be supervised by a port official.

Power vessels may leave the port at any time of the day or night, previous notice having been given to port and customs authorities.

Vessels must discharge all explosives and inflammable materials before entering the docks. Except for this purpose, working cargo in the roadstead is only permitted for vessels of such draft that they cannot enter or leave the port fully laden.

The Traffic Control and Safety System (CONTRASE) is in effect for Buenos Aires. It is mandatory for foreign vessels over 24m in length, as follows:

1. If anchoring outside the port, report vessel's name, flag, and call sign with the time and location.

2. Vessels should report their ETA at destination when passing the following Reporting Points:

a. Along the Canal Punta Indio/Canal Intermedio using VHF channel 12:

i. Near Practicos Recalada Lighted Float
ii. Near paired Lighted Buoys No.1
iii. Near paired Lighted Buoys No.2
iv. Near paired Lighted Buoys No.23
v. Near paired Lighted Buoys No.30
vi. Near lightbuoy km 57

b. Report along the Canal de Acceso al Puerto de Buenos Aires using VHF channel 9:

i. Near Km 37 Lighted Bouy.
ii. Near Km 11 Lighterd Buoy.

c. Report along the Canal Emilio Mitre using VHF channel 72:

i. Near Km 12 Lighted Buoy.
ii. Near Km 18.5 Lighted Buoy.
iii. Near Km 40.5 Lighted Buoy.
iv. Near Km 56.1 Lighted Buoy.

d. Report along the Canal Costanero using VHF channel 72.

e. Report at the approaches to Rio Parana Guazu and Rio Uruguay (Barra del Farallon to Canal Principal) using VHF channel 14:

i. Near Km 38 Lighted Buoy.
ii. At the N end of Barra de San Pedro.
iii. Near Punta Martin Chico.
iv. Near Km 121.5 Lighted Buoy.

f. Upon entring Puerto de la Plata, report to La Plata Prefectura Naval (L5F) on VHF channel 9.

3. In Rada Plata pilot boarding area, report the time of arrival or departure from it on VHF channel 70. Departure time is followed by reporting of ETAs at:

a. Km 37 Lighted Buoy (vessel bound for Canal de Acceso al Puerto de Buenos Aires).

b. Km 38 Lighted Buoy (vessel bound for Barra del Farallon).

c. Km 57 Lighted Buoy (vessel bound for Paso Banco Chico).

d. At the entrance to Puerto de la Plata.

4. When entring port, report the vessel's name, call sign, and ETA at berthing place.

5. Before leaving port, obtain permission, quoting vessel's name, flag, call sign, length, breadth, draft, speed, destination, course, type of cargo, and whether there is a doctor on board. Permission normally remains valid for 15 minutes.

6. Tidal prediction broadcasts are made daily for the Rio de la Plata Exterior at 1000, 1600, and 2200 local time. Tidal queries for other areas are also made available by contacting Hidrografia Naval.

Signals.—Tidal information is transmitted at 5 minutes past each hour on VHF channel 15.

A vessel wishing to pass a dredge must stop and sound one long blast and three short blasts on the siren or whistle.

Permission to pass will be given by a similar signal from the dredge. "Passage obstructed" will be indicated by the dredge sounding two long blasts and three short blasts, and by displaying three balls or exhibiting three vertical red lights. In this case, the vessel must anchor.

Dredges will indicate the side that a vessel should pass by displaying a red and white checkered metal flag, or by exhibiting three lights, red, green, and white disposed vertically. Hopper barges exhibit two white lights amidships, and one red light at each end.

Traffic through the basins in Puerto Madero is governed by the following signals shown from each end of the channel:

1. A red disc by day or a red light by night indicates that entrance on that side is prohibited to all vessels.

2. A white disc by day or a green light by night indicates that passage on that side is allowed for ocean-going vessels only.

3. A disc on its side indicates only tugs or small craft may pass.

Anchorage.—Rada Exterior del Puerto de Buenos Aires lies between the lighted buoys at Km 25 and 37, and clear of the dredged channel. It has depths of 5.8 to 7.9m The holding ground, which consists of soft mud, is not good, and vessels may drag their anchors in strong winds.

Winds from the S produce much swell. When good weather is expected, a vessel with good ground tackle may anchor with safety in a depth of 0.6m greater than her draft.

Caution.--High speed ferries operate between Buenos Aires, Montevideo, and Piriapolis through Canal Sur, Canal Acceso, Canal Intermedio, and the Montevideo Access Channel.

Rio Uruguay and Rio Parana

5.40 Rio Uruguay is approached W of Puerto de Colonia and Isla de Hornos and E of Playa Honda. This route may be used as an approach to Rio Parana, but this river has a delta and can be approached through several mouths which are W of Playa Honda, the deepest and most direct of which is Canal Emilio Mitre, which leads across the W side of Playa Honda.

Pilotage is compulsory for all vessels entering the Rio de La Plata estuary except for coasting vessels. Vessels may proceed as far as Rada de Montevideo or Practicos Recalada without a pilot, but at this point must obtain a pilot to proceed farther.

A 48-hour ETA should be given to the pilot station. This pilot conducts the vessel to the roadstead off Puerto La Plata, where he is relieved if the vessel is bound for Buenos Aires or up the rivers.

Vessels must use pilots of the nationality of their port of destination, and when leaving must use pilots of the nationality of the port they are leaving.

As in other parts of Rio de La Plata, the height of the water level depends largely on the force and direction of the wind. Winds from the SE or S raise the level as much as 1.5m or 1.8m, and winds from the opposite directions lower it. A vessel at anchor will lie heading upriver.

5.41 From Punta Hornos to **Punta Martin Chico** (34˚10'S., 58˚12'W.), about 22 miles NW, the coast is slightly elevated, rising to hills 30 to 36m high.

The most distinctive features are the mouth of Arroyo San Pedro, 6 miles NNW of Punta Hornos; the mouth of Rio San Juan, 4.5 miles farther NW; Torre Anchorena, 69m high, standing on the spit which forms the S side of the mouth of Rio

San Juan; Punta Francesca, at which there is a pier 3 miles NW of the mouth of Rio San Juan; Punta Pereyra, 1.5 miles farther NW; and Cerros de San Juan, three peaks of the same hill, 107 to 137m high, which rise 7 miles ENE of Punta Pereyra and are the highest land around forming a useful mark for vessels navigating in this part of the estuary.

Puerto de Conchillas (34˚12'S., 58˚04'W.) has a pier with 3m alongside.

5.42 A series of channels, named from the S entrance at **Km 39 Buoy** (34˚39'S., 57˚58'W.) as follows: Barra Farallon, Paso del Farallon, and Barra de San Pedro lead to **Km 70 Buoy** (34˚23'S., 58˚00'W.).

At this point the channel divides into two, the E and main channel, then passes through Paso San Juan, Pozos de San Juan, Canal Nuevo, Canal Infierno passing E of Isla Martin Garcia, and then to Canal del Este to **Km 109.5 Buoy** (34˚08'S., 58˚19'W.) where it rejoins Canal Martin Garcia.

The minimum depths in this main channel is promulgated in the Argentine Notices to Mariners and in recent years has ranged between 6.7 to 7.5m.

Canal Martin Garcia, the channel that branched off to the W, is used only by shallow draft vessels.

Piedra Diamante Light (34˚25'S., 57˚58'W.) has a tide gauge.

Regulations.—Vessels whose draft exceeds 7.9m are prohibited from entering Canales a Martin Garcia between Kms 39 and 93.

A vessel drawing more than 7.3m is similarly prohibited, unless capable of exceeding a speed of 10 knots.

Vessels drawing more than 4.6m are prohibited from passing each other in Bara del Farallon between Kms 47 and 51.5, in Barra de San Pedro between Kms 53.5 and 71.3, and in Canal Nuevo between Kms 84 and 86 and Kms 92 and 93.5.

In order to avoid passing, the vessel proceeding upstream should reduce speed in plenty of time, or should anchor until the other vessel has passed.

Playa Honda is an extensive bank formed by the sand and mud brought down by Rio Uruguay and Rio Parana and deposited over the whole of the NW part of Rio de La Plata.

Its S edge is bounded roughly by the parallel of Buenos Aires, where it has depths of 3.6 to 6.4m, and it shoals gradually up to the delta of Rio Parana.

Ruta Playa Honda, a more direct route from Puerto de Buenos Aires to Rios Parana and Uruguay for vessels drawing less than 2.7m, leads across Playa Honda with a least depth that has varied from 2.6 to 3.4m in recent years, but is no longer buoyed.

5.43 Isla Martin Garcia (34˚11'S., 58˚15'W.) lies 2 miles WSW of Punta Martin Chico. It is a mass of granite in the form of a flattened cone, 27m high. Most of the island is wooded.

A wharf extends 60m from the SW side of the island. It has a depth of 1.4m alongside and exhibits a light.

Daytime tidal information is transmitted at 5 minutes past each hour on VHF channel 15.

Night tidal signals, shown from a mast at the signal station situated 0.3 mile NE of the wharf, are made in accordance with the system as shown below. The system is automatic and is repeated every 30 seconds:

1. River rising—one long (2.5 sec) white flash.
2. River falling—two short (0.6 sec) white flashes.
3. River stationary—no white signals.

River levels:

1. Above zero—one long red flash for every 1m, followed by one short red flash for every 0.1m.
2. Below zero—as above with green flashes.
3. At zero—one short green flash, followed by one short red flash.

Canal Santo Domingo, with a least depth of 3m, branches N from Canal del Inferno off Punta Martin Chico and leads to Puerto de Carmelo. The W side of the channel is marked.

The port can also be reached by a channel with a least depth of 0.8m leading E from Canal Principal and passing N of Isla Sola.

Puerto de Carmelo has depths of about 3m alongside its commercial quays and is a yachting center.

Canal Principal leads from the junction of Canal del Este and Canal Martin Garcia at Km 109.5 to the mouth or Rio Uruguay at Punta Gorda, 14 miles NW.

It has a general width of more than 0.5 mile and a least depth of 10.3m. It is marked by lighted buoys.

The mouths of Rio Parana Guazu and Rio Sauce (described in paragraph 5.59 and 5.60, respectively), are on the W side of Canal Principal, 5.5 and 1.5 miles, respectively, S of **Punta Gorda** (33˚55'S., 58˚25'W.).

5.44 From the limit of Puerto Nuevo, the NW part of Puerto de Buenos Aires, to the mouth of Rio Lujan, 10 miles NW, the coast is low with beaches of fine dark sand and outcrops of tufa, one of which, 19m high and known as Las Barrancas, provides the only outstanding feature of the coast.

From seaward it presents an unbroken line of buildings formed by suburbs of Buenos Aires which include Vincente Lopez, Olivos, Anchorena, Las Barrancas, San Isidro, Punta Chica, and San Fernando, the last named, stands on the right bank of Rio Lujan at its mouth.

Buenos Aires Airport, marked by an aero light reported to be obscured by trees, is on the coast immediately NW of Puerto Nuevo.

From the mouth of Rio Lujan to the mouth of Rio Parana Brava, located 2 miles NW of Punta Gorda and at the head of the estuary of Rio de La Plata, the coast is formed by the delta of Rio Parana, which has six principal mouths, and is described later in paragraph 5.54.

The coast between the river mouths is low and fringed with scrub and reeds, but it is well wooded inland.

Canal Costanero (34˚33'S., 58˚25'W.), with depths of 2.4 to 3m depending on state of dredging, leads from the NW end of Puerto Neuvo to the mouth of Rio Lujan. It is marked and is about 0.5 mile offshore. It serves small vessels in the sand and gravel trade and some yachts.

Caution.—It was reported that dredged depths were not being maintained and that depths of less than 2m existed in some areas.

Rio Uruguay

5.45 Rio Uruguay can be divided into three parts by the conditions of navigation, the formation of its banks, and by its depths and currents as follows:

Uruguay Inferior extends from Puerto Nueva Palmira, situated 2.5 miles N of Punta Gorda, to Puerto Concepcion del Uruguay, 99 miles upriver. It has a minimum depth in the fairway of 5.2m below local datum. It is considered to be accessible to oceangoing ships and is tidal.

Uruguay Medio lies between Concepcion del Uruguay and Concordia, 79 miles farther upriver. From the former port to Puerto Fabrica Colon, 23 miles upriver, the minimum depth in the fairway is 3.3m below local datum. Above Puerto Fabrica Colon the river is only accessible to small craft with a maximum draft of 1.8m at LW.

Alto Uruguay (Uruguay Superior) extends from Concordia to the mouth of **Rio Pepiri Guazu** (27˚10'S., 53˚50'W.), which forms the boundary between the Argentine province of Misiones and the Brazilian state of Santa Catarina.

Depths in Rio Uruguay are subject to change. Those given above, and elsewhere in the description of the river, should be regarded as approximate. The latest information regarding depths in the river is promulgated in "Boletin Fluvia" published by the Argentine Ministry of Works.

Pilotage is compulsory in Rio Uruguay for all ocean-going vessels without exception.

Pilots for Argentine ports can be obtained at La Plata for the upriver journey, and at **Concepcion del Uruguay** (32˚29'S., 58˚14'W.) for the return. Pilots for Uruguayan ports can be obtained at Montevideo.

The regulations for vessels wishing to pass a dredge are the same as those for the dredged channels to Buenos Aires previously discussed in paragraph 5.39.

The river is buoyed in accordance with the Argentine system. Most of the buoys below Puerto Paysandu, and many above that port, are lighted. Argentine buoys have their distance, in kilometers, from the confluence of Rio Parana Bravo and Rio Uruguay, near Nueva Palmira, painted on them.

Leading beacons for the passes are usually iron towers with square topmarks painted black and white. Beacons on the Uruguayan bank are wooden framework structures painted red and white.

Lights are shown at certain places.

The river is subject to periodical rises, mainly occasioned by the great rains in Brazil, where it takes its source. It should be noted that this rainfall can be very heavy in almost any month of the year.

In Alto Uruguay, the floods are caused only by the rainfall and are considerable. The river is low during the first part of the year until April, rises temporarily in June, and then rises to its highest level in September and October.

At Barra Concepcion, 297 miles above Concordia, the highest known rise is 18m. The height of the floods decreases downstream. Near Concordia, the highest known rise is 16m above local zero.

Irregularities in the river level may be produced at times by flood water from its more important tributaries.

In Uruguay Medio, the rise in the river level caused by floods is much less, and the effect of the tides and winds of Rio de La Plata begins to be felt, but the general characteristics are the same as for Alto Uruguay.

The height of the river above local datum at the three main ports of Uruguay Medio during various periods of the year is given in the table below.

Rio Uruguay river levels.—From January to March, the river level at Concepcion del Uruguay is 1.2 to 1.8m. At Fabrica Colon, the level is 1.5m and at Concordia, 1.8 to 3m.

From April to June, the river level at Concepcion del Uruguay is 2.1m, Fabrica Colon, 2.7m, and at Concordia, 3.7 to 4.9m. From June to August, the river levels are slightly lower in all places.

From September to October, Concepcion del Uruguay is 2.4m, Fabrica Colon, 3m, and at Concordia 5.8m.

The greatest height recorded in recent years at Concepcion del Uruguay was 10.2m, caused by winds from SW blowing along Uruguay Medio.

In Uruguay Inferior, the effect of the floods becomes less and the influence of the tides and winds of Rio de la Plata is more apparent.

Except when the current in the river is very strong, the tide is felt as far upriver as Concepcion del Uruguay.

At all times, it is felt as far as Puerto de Fray Bentos, about 50 miles from the mouth of the river, though its range is only from 0.3 to 0.6m.

Fresh S or SE winds may raise the level as much as 3m, and storms from these directions have caused the level to rise as much as 4.6m at the mouth of **Rio Gualeguaychu** (33˚05'S., 58˚24'W.), located W of Fray Bentos.

From January to April, the level at the mouth of Rio Gualeguaychu usually remains between 0.9 and 1.2m above zero. It is rarely lower than 0.5m above zero, and even then, soon rises again. From May to November, the level usually remains at about 2.1m above zero, the maximum and minimum levels being about 2.4m and 1.7m, respectively.

The following gives the relation between the corresponding rises in the level of the river above local datum at various places. Thus, if the rise at one place is known, then the corresponding rise at other places can be estimated. The levels thus obtained should be regarded as approximate only.

Rio Uruguay—Comparative Levels

Fray Bentos	Concep-cion del Uruguay	Colon	Nueva	Escocia Concordia
1.5m	1.8m	2.1m	3.3m	4.5m
2.0m	3.2m	4.1m	6.8m	9.0m
2.5m	4.2m	5.1m	8.2m	0.7m
3.0m	4.6m	5.7m	8.5m	0.8m
3.5m	6.9m	8.5m	11.5m	14.2m

Gauges are at the various ports and dredged channels. These gauges are graduated in meters, indicating the height of the river level above local zero, which is the lowest level to which the river falls at each place.

Those at the dredged channels are also graduated in meters, indicating the least depth in the channel at the time.

The currents in Rio Uruguay depend upon the tide and the height of the river level. Normally the rate does not exceed 1.75 to 2 knots, but it may reach 3.5 knots when the level is very high. The rate increases upriver. In the lower reaches, the current depends upon the tide and may run in either direction, its rate being between 0.5 and 1.75 knots.

The currents are also affected by the wind, especially in the lower reaches. Winds from SW may arrest or even change the direction of the current, especially when the river is low.

This action is increased by such winds causing a rise in the water level in Rio de la Plata, and its effect is immediate and almost always felt.

Winds from the N, which lower the level in Rio de la Plata, also affect Rio Uruguay causing an increase in the rate of the current down river.

Rio Uruguay Inferior

5.46 Rio Uruguay is entered between **Punta Gorda** (33˚55'S., 58˚25'W.), a wooded bluff 26m high, and the N part of the delta of Rio Parana 1.25 miles W. A white obelisk is on Punta Gorda.

From **Punta Chaparro** (33˚49'S., 58˚26'W.), 5 miles N of Punta Gorda, to Puerto de Fray Bentos, 45 miles further N, the river is 1.25 to 6 miles wide and the bottom is mud and fine sand. There are no islands, but there are extensive sandbanks which dry at low river. Between them lies the main channel which is wide and deep and is buoyed throughout its length.

The Argentine or W bank is very low and covered with dense vegetation, but the Uruguayan or E bank is generally high and sandy with little vegetation.

Between Fray Bentos and **Puerto Concepcion del Uruguay** (32˚29'S., 58˚14'W.), the river divides into numerous branches, separated by islands which are subject to inundation and are covered with high and dense vegetation.

The "Pasos," or shallow passes, in this part of the river are few and of small extent, and are dredged from time to time.

They are well marked by lighted buoys, and since the bottom is mud or fine sand, present no danger to navigation.

Rada de Nueva Palmira comprises the reach of Rio Uruguay lying W of the coast between Nueva Palmira and Punta Chaparro. Depths in it vary between 14m and 20m over a width of 0.5 to 0.8 miles, shoal water extending for a considerable distance off both banks.

Restinga de Palmira, a rocky ledge with a depth of 1m, is 0.2 mile off the E bank of the river; it is marked by a buoy close W and is covered by the red sector of the light on the S end of the wharf at Nuevo Palmira. The bottom of the roadstead W of this danger is rocky.

5.47 Puerto de Nuevo Palmira (33˚53'S., 58˚25'W.) (World Port Index No. 13150) has an official quay 240m long with a width of 40m and a depth alongside of 8.3m. Length of the head of the pier is 80m.

After passing between Punta Chaparro and Punta Carbon, 1.25 miles SW, the river widens considerably and reaches a width of about 6 miles at **Arenal Grande** (33˚41'S., 58˚26'W.), a point on the E side 8.5 miles N.

Anchorage may be obtained by deep-draft vessels in Fondeadero del Arenal Grande, a pool extending N from the main channel close N of Arenal Grande where there is good holding ground. Depth of the anchorage range from 9.1 to 13.7m.

Vessels of shallow draft usually anchor near the E shore between Estancia Casa Blanca and the mouth of Arroyo La Agraciada.

For a distance of 7 miles N of the mouth of **Rio San Salvador** (33˚28'S., 58˚24'W.), the E bank of Uruguay River is formed by the delta of the Rio Negro. The Rio Negro is navigable by small craft, but only vessels registered in Uruguay are permitted to proceed to the interior ports of Uruguay.

Punta Laguna (33˚04'S., 58˚21'W.) is on the W bank of Rio Uruguay. A channel, about 1 mile N of the point, leads into the mouth of Rio Gualeguaychu and to the Argentine town of Puerto Gualeguaychu. Depths of 2.7m are available to the town. Permission to enter is obtained at the Coast Guard station at the river mouth.

5.48 Puerto Fray Bentos (33˚07'S., 58˚19'W.) (World Port Index No. 13160) is on the E bank of Rio Uruguay, E of Punta Laguna and 126 miles from Buenos Aires. The maximum size of the port is controlled only by the draft of the vessel and the length of the berth.

The port is a meat-packing center. The berth for ocean-going vessels is 325m long. The outer side of the wharf, which has a berth 125m long and depths alongside of 7 to 7.9m, is used by ocean-going vessels. On the inner side of the wharf is 250m of berthing space for coasting vessels; there is a depth alongside of 4 to 6m.

Close W of this wharf is the railroad pier. The pier has a depth alongside of 7.9m and is used for the discharge of coal.

The Anglo Pier, the W most pier, is owned by a meat-packing company. It is 180m long at its head, with an alongside depth of 7.9m.

A bridge crosses Rio Uruguay at Km 101.2, 3 miles above Fray Bentos. Navigable width is 201m between spans and clearance is 43m.

Between Fray Bentos and Concepcion del Uruguay, 47 miles upriver, there are numerous islands.

For the first 25 miles, as far as **Paso Roman** (32˚49'S., 58˚08'W.), the main channel which is indicated on the chart, winds through these islands, but then it passes between them and the E shore.

Anchorage, with good holding in a depth of 8.2m, is in mid-channel abreast the N pier at Nueva Berlin, which is on the E bank of the river 15 miles above Fray Bentos.

Anchorage can be obtained by small craft near the piers at the port or in the bay close W. Oceangoing vessels should anchor near the Argentine shore.

5.49 Puerto Concepcion del Uruguay (32˚29'S., 58˚14'W.) (World Port Index No. 13740), an Argentine port on the W bank of Rio Uruguay, 173 miles above Buenos Aires, is a departmental capital and the center of a large grain growing area.

Access to the port is by a channel 1,000m long with a width of 60m wide and a depth of 6.1m; however, it is recommended

that a maximum safe draft of 5.2m be used. The largest vessel to enter the port had a LOA of 220m.

Pilots are reported to be available here or board at Buenos Aires.

There is 1,500m of quayage at the port, of which 1,100m with a depth alongside of 5m, is for ocean-going vessels. The remaining 400m is for use by river craft. There are berths for tankers at the S end of the port.

Anchorage is available in the roadstead clear of the main channel and preferably on its W side.

Rio Uruguay Medio

5.50 Rio Uruguay Medio is from 0.6 to 0.8 mile wide; the bottom is stones and sand, with isolated reefs in places. Both banks are low, particularly on the W or Argentine side, and there are numerous large islands. The channels in the narrowest reaches have a width of 80m and a sandy bottom.

The few reefs which exist are marked by light vessels during the low river season, but they are no longer necessary and are removed when the river reaches a level of 4m above datum.

The principal reefs are Restinga del Hervidero and Restinga de Coralito, at the passes of the same names, 12 and 2 miles, respectively, down river from **Puerto de Concordia** (31˚24'S., 58˚00'W.).

Puerto Fabrica Colon, 23 miles above Concepcion del Uruguay, can be reached at low river by vessels drawing up to 3.4m. From Fabrica Colon to Concordia and Salto, navigation is only possible for small vessels.

At low river, those drawing up to 2.7m can reach Concordia, and those drawing up to 1.8m can reach Salto, but by taking advantage of the frequent rises in the river level, vessels drawing up to 3m can reach both these ports.

Between Concepcion del Uruguay and Puerto Paysandu, 12 miles upriver, the channel is constricted by Paso Almiron Chico and Paso Almiron Grande located 5 and 6 miles, respectively, above the former port.

Both passes have a channel about 100m wide with a depth of 3.4m.

5.51 **Paysandu** (32˚19'S., 58˚04'W.) (World Port Index No. 13170), on the E bank of Rio Uruguay 12 miles above Concepcion del Uruguay, is an industrial town and the center of a cattle raising district.

Navigation to Paysandu is controlled by the depth in the passes leading to it. Because river conditions vary seasonably, agents should be consulted beforehand regarding available draft at anytime.

There is a grain elevator berth with an alongside depth of 6.1m and a length of 100m for ocean-going vessels.

A coastal berth is also available with a length of 300m an alongside depth of 3.4m.

Rada de Paysandu, which has depths of 7 to 21m in the fairway, extends across the whole width of the main branch of the river abreast the port, but a bank extends about 183m from the W side at its N end.

Small craft can shelter from southerly gales in a small bay located between the wharves and the railway sidings close to the power station.

Between Paysandu and Puerto Colon, 6 miles upriver, the least depth is in Paso San Francisco, which lies between Isla San Francisco and the W bank a short distance below the latter port. This pass has a channel 80m wide with a minimum depth of 3m; the bottom is sand and stones.

A bridge crosses Rio Uruguay at Km 209.5, about 3 miles N of Paysandu. The vertical clearance is 34m, with a width of 120m between the bridge piers. The navigable channel is marked by lights.

5.52 **Colon** (32˚13'S., 58˚08'W.) (World Port Index No. 13730), on the W bank of Rio Uruguay about 5 miles above Paysandu, has a three-sectioned wharf. Each section is 53m long and has a different height in order to facilitate working cargo at different river stages. The S most section has depths of 3.7m alongside.

Puerto Fabrica Colon, 5 miles above Colon and on the W bank of Rio Uruguay, is a private port serving a large meat-packing plant.

The S wharf has a berthing length of 24m, with depths of 4.3 to 4.6m alongside. The central wharf, which is the only one used by ocean-going vessels, is 40m long and has depths of 8.2 to 8.5m alongside.

The N wharf has a berthing depth of 10m and depths of 6.7 to 7m alongside.

Between Fabrica Colon and Puerto Concordia, 57 miles upriver, the minimum depth in the passes is 2.7m. The worst reach is at Paso Coralito, 2 miles below Concordia, where the whole river is obstructed by a series of reefs.

There is a buoyed channel through these reefs which can safely be used by day, but no vessel should attempt it by night without local knowledge.

When the river level is 5m above datum at Concordia, vessels drawing up to 3m can proceed through this pass by keeping close to the vegetation on the E bank, where the current is not felt so strongly.

Between Concordia and Puerto de Salto, 1.5 miles upriver, the channel is obstructed by a reef which extends from the W bank leaving only Paso de la Cabadalla, a narrow channel between it and the E bank. Local knowledge is essential for this channel.

Puerto Nuevo Escolia and Puerto Yerua are small ports on the W bank of Rio Uruguay, 37 and 45 miles, respectively, above Fabrica Colon.

Rio Alto Uruguay

5.53 **Concordia** (31˚24'S., 58˚02'W.), on the W bank of Rio Uruguay, is the center of a stock raising and agricultural region. The passenger wharf is 50m long with a depth of 2.7m alongside.

There is a 181m long wharf, with a depth of 2.1m alongside, for use by river craft.

Salto (31˚23'S., 57˚58'W.), the second largest city in Uruguay, is an agricultural and stock raising center.

The wharf here, 140m long, has depths of 3 to 4.3m alongside.

Navigation above Salto is by small craft only.

Rio Parana

5.54 Rio Parana discharges into the W side of the head of Rio de la Plata by many mouths between the parallels of 33˚53'S, and 34˚27'S.

Of the branches which form the delta, only Rio Parana de las Palmas, Rio Parana Guazu, Rio Sauce, and Rio Parana Bravo are of any importance to ocean-going vessels. The delta extends to the junction of Rios Parana de las Palmas and Parana Guazu, about 67 miles above the mouth of the former branch.

Tides—Currents.—The level of Rio Parana undergoes a regular annual change caused by the periodic rainfall in the tropical regions of the river basin. Because of this cause, the level is highest in March and lowest in September. Rises in level are also caused by the irregular rains in the more southerly regions of the river basin.

These cause a rise in level from May to July and also in November and December. In general, the river is lowest in September, but it may remain low until December, or in exceptional years, until January.

In the lower reaches of the river, the level is affected by changes in level in Rio de la Plata, the tides of which may be felt, at low river, as far as Rosario.

In the navigable part of the river, the rate of the current is generally about 2 knots at low river and 3 knots at high river, but these rates are frequently exceeded in the narrow parts.

In Rio Parana Medio, the maximum rate of the current is 4.5 knots and the minimum rate is about 2 knots.

Depths—Limitations.—From its mouth to **Bella Vista** (32˚41'S., 60˚44'W.), the river has a minimum depth of 7.6m which is maintained by dredging. Then to Parana, the limit of navigation for ocean-going vessels, the depths are similarly maintained at not less than 5.8m.

The depths given above, and elsewhere in the description of the river, are subject to continual change and must be regarded as approximate.

The Argentine Ministry of Public Works produces "Boletin Fluvial," a weekly publication which gives the depths in the main and secondary channels of Rio Parana.

Information regarding depths is also broadcast from certain Argentine radio stations.

Aspect.—Rio Parana is marked by buoys in accordance with the Argentine system as far as Posadas, most of the buoys below Corrientes being lighted. There are also leading beacons, lights, and tide gauges.

Pilotage.— Pilotage is compulsory for all deep-sea vessels. Pilots are obtained at Buenos Aires and at Puerto de La Plata. These pilots only conduct vessels as far as Santa Fe.

Regulations.—The regulations for vessels wishing to pass a dredge are the same as those for the dredged channels to Buenos Aires and are described in paragraph 5.39.

Caution.—Detached clumps of grass and weeds, many of considerable size, are continually floating down the river and are liable to foul the lighted buoys, which may then be capsized and their lights extinguished.

It was reported that many buoyage aids have been destroyed by floating debris carried by flood waters and that depths in the river have been reduced by considerable silting.

Vessels lying at anchor in the river are recommended to keep their hawse pipes covered as a precaution against snakes crawling up the cables from these clumps when foul of the cable.

5.55 Rio Lujan (34˚26'S., 58˚31'W.), the S branch of the delta of Rio Parana, is approached from Buenos Aires via Canal Costanero which has been described previously in paragraph 5.44. It is connected to Rio Parana de las Palmas to the N by various channels navigable by small craft with local knowledge.

Puerto San Fernando and Puerto Tigre, on Rio Lujan, are small-craft ports with boat building and repair facilities.

Rio Parana de las Palmas (34˚20'S., 58˚27'W.) is the S most principal entrance to Rio Parana.

Canal Emilio Mitre, the access to Rio Parana de las Palmas for ocean-going ships, is 140m wide and was dredged (1997) to a depth of 9.7m.

This dredged channel leads from Km 12 of Canalde Acceso al Buenos Aires, across the W side of Playa Honda and into the mouth of the river. The channel is well marked.

5.56 Puerto Campana (34˚09'S., 58˚58'W.) (World Port Index No. 13710) is on the SW bank of Rio Parana de las Palmas and 25 miles above that river's mouth.

The approach to the river is not usually undertaken at night, and at certain times of the year there is fog almost daily. The navigable part of the channel at the port is wide and deep and ships can maneuver easily.

Tankers up to 25,000 dwt and 200m long visit the port regularly. There are eight berths in the port having depths in fresh water 6.7 to 9m alongside. A general cargo berth is 116m long with depths of 6m alongside.

Berth H takes tankers upto 5.8m draft.

Berth E is for chemical tankers upto 8.2m draft.

Berth A is used by tankers upto 6m draft for tank cleaning.

Berth C is for vessels upto 250m LOA in a depth of 12m laongside .

Berth G is for vessels upto 100m length in a depth of 5.5m alongside.

About 1.2 miles upstream from Campana is a new wharf, which is 185m long with a depth of 10.6m alongside. The wharf is used for the discharge of iron ore.

Anchorage.—Ships awaiting a berth usually anchor about 1 mile downstream from the tanker berths in depths of 12 to 21m, mud and sand.

5.57 Puerto Zarate (34˚05'S., 59˚02'W.) (World Port Index No. 13700), 5 miles above Puerto Campana, exports grain and frozen meat.

The navigable channel at the port is wide and deep, with a maximum depth of 8.2m.

Berths can provide depths up to 10m by fendering off as light distance.

Wharves used by the Argentine Navy should not be approached closer than 50m without permission.

A railroad bridge, with a vertical clearance of 49m, crosses the river at Zarate.

5.58 Puerto Atucha (33˚58'S., 59˚16'W.) lies 15 miles upriver from Puerto Zarate and consists of a wharf, 33m long with a depth alongside of 12.2m, which serves an atomic energy plant.

Zanja Mercadel, a channel 3.5 miles long and with a depth of 4m, connects Rio Parana de las Palmas with Rio Parana Guazu and begins about 26 miles above Zarate.

5.59 Rio Parana Mini (34˚14'S., 58˚23'W.), about 6 miles NE of the entrance to Rio Parana de las Palmas, has a depth of 1m over the bar.

Rio Barca Grande (34˚10'S., 58˚23'W.), 5 miles farther NNE, has a depth of 4m over the bar.

Neither is marked, and both lead into Rio Parana Guazu 11 miles above its mouth. Both are used only by shallow-draft vessels.

Rio Parana Guazu (34˚01'S., 58˚25'W.), about 19 miles NNW of the entrance to Rio Barca Grande, is 58 miles long and extends to Rio Parana Bajo at Km 230. This passage is narrow and should not be used by vessels drawing more than 5.2m.

A bridge, with a vertical clearance of 50m, spans the river 1 mile SE of the junction of Rio Parana Guazu and Pasaje Talarera. Pontoons protect the upstream side of the bridge supports. The navigable width between the pontoons is 240m.

5.60 Rio Sauce (33˚57'S., 58˚27'W.), 4.5 miles NNW of the mouth of Rio Parana Guazu, is 7 miles long and joins Rio Parana. This branch usually has a depth of 6m and the minimum width is about 91m.

Rio Parana Bravo (33˚54'S., 58˚27'W.), 3 miles N of Rio Sauce and to the W of Nueva Palmira, is 17.5 miles long and usually has depth of 10.4m.

It is the entrance most used by ocean-going vessels proceeding to the upper reaches of Rio Parana.

5.61 Puerto Ibicuy (33˚45'S., 59˚11'W.) (World Port Index No. 13690) is on the E bank of Rio Parana, about 52 miles above the Rio Parana Guaza mouth.

There is a tanker berth with 7.6m alongside, and other berths with depths of 5.5m alongside.

Rio Parana Bajo is the section of Rio Parana which extends from the junction of Rio Parana de las Palmas with **Rio Parana Guazu** (33˚44'S., 59˚11'W.) to a point about 20 miles above Puerto Rosario, 121 miles upriver.

It has least depths in the passes at low river of 7.6m which are maintained by dredging. Pilotage is compulsory. River pilots berth the vessels.

5.62 Puerto San Pedro (33˚35'S., 59˚49'W.) (World Port Index No. 13670), 23 miles up Rio Parana Bajo on the SW side of the river, is a cereal exporting port.

Vessels with drafts up to 7.3m can be accommodated at two wharfs, each with a berth 75m long at its head.

It is reported that on the S side of the S wharf there is a berth 218m long dredged to 9m.

Puerto Obligato, a former grain port no longer used, is 11 miles above Puerto San Pedro.

5.63 Puerto Ramallo (33˚29'S., 60˚01'W.) (World Port Index No. 13660), on the SW river bank 14 miles above Puerto Obligato, is a grain port. The maximum permissible draft for vessels entering the port is 5.5m with a length of 150m.

The grain mole can accommodate one vessel with a maximum length of 145m. Muelle Nacional, 100m long with 3.7m alongside, handles sand barges and other river craft. The tanker berth has a depth of 7.5m alongside.

Access is gained through the general channel which has a depth of 7.3m.

Water and provisions are available, and medical assistance can be had.

A column, illuminated by mercury vapor lights, is on the waterfront in the middle of the port.

The currents in the vicinity of the port are strong, and ships alongside may roll even in light winds. There are mooring buoys off the wharves to hold vessels off because of these currents and strong mooring lines should be used.

An anchorage marked at its corners is in midstream off the port.

Islands again divide the channel between Puerto Ramillo and Puerto San Nicolas, 11 miles upriver.

5.64 Puerto San Nicola (33˚20'S., 60˚14'W.) (World Port Index No. 13650), on the SW bank of the river 11 miles above Puerto Ramallo, is the port of an industrial town. The port is entered by an access channel. The maximum depth of the channel is 9.4m.

The port is divided into two parts. Embarcaderos, the oldest part of the port, lies abreast the city.

Puerto Nuevo, 1.5 miles downstream from the city, consists of a concrete mole 537m long and a grain berth that is 220m long. A 200m long coal discharge pier is located here, and has depths of 7m alongside.

Puerto Buitagro is about 2 miles downstream from Puerto Nuevo. The general mole is 320m long and handles general cargo. The Somisa Wharf, used by lighters discharging coal and iron ore, consists of four dolphin wharves forming a continuous structure 100m long.

The bulk wharf, close S of the Somisa Wharf, is 680m long with a depth alongside of 7.9m. The wharf can handle four vessels of up to 22,000 dwt.

In the event of high winds, tugs can be ordered from Puerto Villa Constitucion.

An anchorage is about 3 miles down river from the port.

5.65 Puerto Villa Constitucion (33˚14'S., 60˚20'W.) (World Port Index No. 13640) is on the SW bank of the river, 9 miles above Puerto San Nicolas. The port is entered by an access channel. The maximum depth of the channel is 7.3m.

The Elevator Terminal, a pier projecting ESE from the shore, can berth two grain vessels simultaneously in a depth of 8.2m.

Puerto Acevedo, about 1 mile S of the port, has a 111m long mole, with a depth of 8.8m alongside, serving a large steel mill. The PASE wharf, serving an electric smelting plant, is 170m long and accommodates ore carriers up to 35,000 dwt.

A conspicuous water tower, marked by obstruction lights, lies close S of the steel mill wharf.

Puerto San Nicola

Anchorage for vessels waiting to berth is at Puerto Acevado, 1 mile SE of the harbor. Towage is compulsory for all movements within the harbor.

From 7 to 18 miles above Puerto Villa Constitucion, the river widens and is divided by many islands. The main channel passes between these islands and the SW bank of the river.

5.66 Puerto Rosario (32˚57'S., 60˚38'W.) (World Port Index No. 13630.), on the SW bank of the river, is 26 miles above Villa Constitucion. It is the principal port on the river, and the second most important port in Argentina. Nearly half of the cereals in the country are shipped from here.

The port is used for grain, vegetable oils, fuel, timber, meats, etc., and there is specialized cargo-handling equipment. The channel of the river, within the limits of the port, are dredged to a minimum of 7.6m. There are two tanker berths, each 152m long, with a depth of 8.2m alongside.

The main channel in the river between Puerto Rosario and Puerto San Lorenzo, 11 miles upriver, is kept dredged to 7.6m. By way of Rio Parana de las Palmas and Canal Emilio Mitre (paragraph 5.55), vessels can sail from port with a draft of 9m.

5.67 Puerto San Lorenzo (32˚45'S., 60˚44'W.) (World Port Index No. 13610) was originally a port for the export of grain only, but its trade now includes chemical products, vegetable oils, and petroleum products. It is situated on the right bank of the River Parana, about 16 miles N of Rosario, and 238 miles of river passage from Buenos Aires.

There is an anchorage, marked by buoys, close down river from the port where vessels can lie while waiting to berth alongside. The port has several wharves equipped for handling grain, and four tanker berths, all of which can accommodate ocean-going ships. Pilotage is compulsory for all vessels.

5.68 Puerto San Martin (32˚43'S., 60˚44'W.) (World Port Index No. 13600), close upriver from San Lorenzo, has wharves for handling grain, liquid gas, vegetable oils, and general cargo. All can accommodate ocean-going vessels. The port is approached through a 75m wide channel with a depth of 6.1m.

Rio Parana Bajo joins Rio Parana Medio at a point about 6 miles above Puerto San Martin.

5.69 Puerto Diamante (32˚04'S., 60˚39'W.) (World Port Index No. 13580.) is on the E bank of the river about 43 miles above Puerto San Martin.

Vessels drawing up to 7.6m can use the port, but the controlling depth is on the bar at Isla de los Pajaros, 28 miles down river and is subject to variation. A grain-loading wharf at the port has a depth of 7.5m alongside.

5.70 Puerto Santa Fe (31˚39'S., 60˚42'W.) (World Port Index No. 13560), 90 miles above Puerto Rosario, is in a rich agricultural region and exports cereals, cotton, minerals, and sugar.

Depths—Limitations.—Dock 1 has stone wharves, with 564m of frontage on the E side and 672m of frontage on the W side.

It is 120m long, has a depth of 7.3m, and can accommodate four vessels. Grain can be handled at a 240m long berth at the S side of the W end of the dock.

Dock No. 2, parallel to Dock No. 1, is no longer in use by vessels. It is also 120m wide and has a depth of 6.7m.

Derivation Channel, extending W of Dock No. 2, is 2,178m long and is used for handling inflammables.

The Coasting Wharf, 810m long with a depth of 7.3m alongside, is a continuation of the W side of Dock No. 1. It is used mainly by river craft.

Puerto San Lorenzo

Pilotage.—A harbor pilot takes over from the river pilot at the anchorage. He arrives with the tug or tugs, which assist in berthing, the use of which is compulsory.

Canal Acceso, giving access to the port, is an artificial channel 40m wide and dredged to a depth of 5.5m. Ocean-going ships may not pass any other vessel in the channel, but river craft and other small vessels may pass each other.

Maximum speed in the entrance channel is 5 knots; however, the pilot can advise on other speeds. Movement by night is possible, but usually pilots will not take a vessel out after 1500 hours. During periods of fog, entrance or departure is prohibited without special permission.

Regulations.—Within the port, passenger vessels are limited to 4.5 knots and other vessels 3.5 knots.

Signals.—Traffic through Canal Acceso is regulated by the following signals which are displayed from signal stations at both ends of the channel by day, and from the inner station only by night:

Free entry for ocean-going ships is signified by a white ball by day and white flashes at night.

Free exit for ocean-going ships is signified by a red cone by day and red flashes at night.

Free entry and exit for river craft is signified by a green cone point up by day and green flashes by night.

Entry and exit for river craft with precautions is signified by a yellow cone point down by day and red and green flashes by night.

Anchorage.—Vessels waiting to enter the port may anchor S of the outer entrance to Canal Acceso near Km 483, where the channel is wide enough to permit several vessels to lie at anchor and still leave a channel wide enough for navigation.

5.71 Puerto Parana (31˚43'S., 60˚32'W.) (World Port Index No. 13570) is obstructed by a bar with a minimum depth of 3.9m and is therefore only accessible to ocean-going ships at periods of very high river. In the port there are wharves with depths up to 4.6m alongside.

Puerto Corrientes (27˚29'S., 58˚50'W.) (World Port Index No. 13370), lies about 328 miles above Puerto Parana.

About 18 miles above Puerto Corrientes, the river forks to become Rio Paraguay and Rio Alto Parana.

Puerto de Asuncion (25˚16'S., 57˚41'W.) (World Port Index No. 13250) is the capital of Paraguay.

There are some minor river ports along the Rio Alto Parana as far as the **Rapides de Apipe** (27˚29'S., 56˚43'W.), which are about 141 miles above Puerto Corrientes and are the limit of navigation for small vessels and tows.

Table of Contents